BULLETIN

Vol. 25, No. 1 - January 1954

Chicago Natural History Museum

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

ALFRED CLEVELAND WEED
1881—1953

News has been received at the Museum of the death on November 30, 1953, of Alfred C. Weed, retired Curator of Fishes. He was seventy-two years old. Mr. Weed joined the staff of the Museum in January, 1921, at the time the collections and exhibits were being moved from Jackson Park to Grant Park. His first major task, therefore, was arranging the fish collection in new sequence and relabeling most of it and unpacking, cataloguing, and labeling several stored and inaccessible large collections, a tremendous task that was carried on virtually alone. His principal efforts during the twenty-one years he was in charge of the Division of Fishes were directed toward adding to the study collections and improving the exhibits. This latter work (with Leon L. Pray as artist and taxidermist) produced the habitat groups and systematic series in the Hall of Fishes (Hall O), which was opened in July, 1941, two years before Mr. Weed was forced to retire because of poor health. He conducted a number of expeditions, usually with the double purpose of securing exhibition and study material. The most notable of these were to the upper Mississippi River in 1922 and to Louisiana and Texas in 1923 and 1924. In 1926 and 1927–28, he participated in the Rawson-MacMillan Subarctic Expeditions to Labrador, Greenland, and Baffin Island, and in 1937 he conducted an expedition to the coast of Maine to collect material for habitat and systematic exhibits.

ALFRED C. WEED

STAFF NOTES

Dr. Sharat K. Roy, Chief Curator of Geology, **Robert K. Wyant,** Curator of Economic Geology, **Bryan Patterson,** Curator of Fossil Mammals, and **D. Dwight Davis,** Curator of Vertebrate Anatomy, attended the annual meeting of the American Association for the Advancement of Science held in Boston late in December. Chief Curator Roy and Curator Wyant participated in a symposium on the origin of meteorites, and Curator Patterson and Curator Davis took part in one entitled "Non-Human Primates and the Problem of Human Evolution." **Dr. Paul S. Martin,** Chief Curator of Anthropology, **Donald Collier,** Curator of South American Ethnology and Archaeology, and **Miss Elaine Bluhm,** Assistant in Archaeology, attended the annual meeting of the American Anthropological Association held in Tucson, Arizona, from December 26 to 30. Chief Curator Martin presented a paper on his 1953 excavations in New Mexico and another in the symposium on the Southwest. Curator Collier presented a paper on Peru in the symposium on "Comparison of Early Irrigation Civilizations" and served as chairman of the session on Southwest archaeology . . . In December **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, spoke before the Illinois Orchid Society on "Orchids of Guatemala" and before the Hinsdale Garden Club on "Exploring for Plants in the 'Lost World' of Venezuela."

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Dr. R. W. Mendelson, Albuquerque, N. M.—a Bangkok hat, portion of Buddhist scripture incised on palm-leaf strips, and an embroidered-silk wall hanging, Siam

Department of Botany:

From: Agricultural and Mechanical College of Texas, College Station—24 Commelinaceae, Mexico; Holly R. Bennett, Chicago—460 miscellaneous phanerogams, Chicago, and 146 miscellaneous phanerogams, Montana; Illinois State Museum, Springfield—*Aster furcatus*, Illinois; Dr. Earl E. Sherff, Chicago—148 phanerogams, Hawaii, and 172 negatives, 172 prints; Floyd A. Swink, Chicago—211 phanerogams, Chicago; Frank O. Smith, Ames, Iowa—*Physalis aequata* Jacq., Mexico

Department of Geology:

From: Mrs. Robert H. Whitfield, Evanston, Ill.—Pennsylvanian insect, Carbondale formation, Braidwood, Illinois

Raymond Foundation:

From: Mrs. Hermon Dunlap Smith, Lake Forest, Ill.—8 black-and-white slides

THIS MONTH'S COVER

The whaleheaded stork of Africa, pictured on the cover, is one of the largest and most impressive species found in a continent noted for the wealth and variety of its birds. Although related both to storks and to herons, whaleheads nevertheless have distinctive anatomical features that place them in a separate family. The single species occurs only in central Africa, where it frequents the great marshes of the White Nile River in Egypt south to the Lake Victoria region of Uganda. Standing about 40 inches high and characterized by a remarkably massive bill, the whaleheaded stork is the most imposing bird of its habitat. The specimen portrayed is one of the central figures in a new and strikingly realistic habitat group (Hall 20) of the marsh birds of the upper Nile River (see page 3). All specimens and accessory materials for the exhibit were collected in 1952 by the Buchen East Africa Expedition.

NEW MEMBERS

The following persons became Museum Members from November 16 to December 15:

Non-Resident Life Member

E. J. Knudtzon

Associate Members

Edward McC. Blair, N. J. Lavezzorio, Carl E. Olin, John E. Stipp

Annual Members

Mrs. C. C. Campbell, Harry A. Coldiron, Willard Gidwitz, Wilson T. Herren, Earl Johnson, Walter C. Lindley, Jr., Herbert H. Lissner, Arthur J. Lowell, Robert B. Mahan, R. F. Malcolmson, Mrs. Andrew R. Mellody, Miss Margaret Mellody, C. W. Mercer, Francis K. Mettenet, Robert W. Mullenix, Donald C. Mullery, C. Frank Newburg, C. G. Newton, Miss Geraldine O'Leary, Henry R. Platt, Jr., Ernest H. Reed, H. Edward Reeves, Rollin W. Roach, R. F. Searson, C. H. Sethness, Jr., Dr. Kenneth P. Sharpe, John W. Shaw, Frank R. Walker, John Wieland, Frederick C. Williams, W. J. Williams

BIRDS OF NILE PAPYRUS MARSH IN NEW HABITAT GROUP

THE EXPEDITION

By WALTHER BUCHEN
MEMBER, BOARD OF TRUSTEES

For years the Museum has had a vacant case among its bird habitat groups in Hall 20—a case labeled "Crowned Crane and Marsh Birds of the Nile—an exhibit to be constructed." Finally through the activity and the generosity of Mr. and Mrs. Walther Buchen this group has become a reality. In the following articles Mr. Buchen, a Trustee of the Museum, tells of his expedition to the Upper Nile to collect material used in this group, and Dr. Austin L. Rand, Curator of Birds, tells of its preparation in the Museum for exhibition.

WE LEFT NAIROBI in Kenya Colony, bound for Uganda, on May 31, 1952, when the Long Rains were still at work and would be for some weeks to come. Mrs. Buchen and I were fortunate to have three of the most competent and delightful companions imaginable in our party: our ornithologist, Dr. John Williams, of Coryndon Museum in Nairobi, and Myles Turner and John Sutton, our hunters, who managed the safari. In addition, there were fifteen natives. Our outfit, furnished by Ker & Downey, Safaris, Ltd., consisted of a four-wheel-drive Dodge Power Wagon, which was our passenger car, and two 3-ton Bedford trucks. All of them were heavily loaded with baggage and camping equipment.

After four days and more than 600 miles of wet African roads, we made camp at Erima, a tiny fishing village on the shores of Lake Kyoga, in the region where the Victoria Nile enters the lake. On the advice of Major Kinloch and Mr. Mills of the Uganda Game Department, Dr. Williams had selected this spot as our likeliest hunting grounds for the rare whaleheaded stork.

It was difficult to get information from the fishermen of Erima. They knew little Kiswahili, the intertribal language that passes freely among many tribes in more than a million square miles of East Africa. The Uganda Game Department had very kindly offered us a native game-scout to act as interpreter, but he did not understand the local dialect. Williams tried to communicate what bird we were interested in by drawing a picture of the whaleheaded stork, emphasizing the big bill and oddly crested head. One native, who talked a little Swahili, told us that we could easily find such a bird. This was only slightly comforting because African natives generally tell you what they think you want to hear.

LAKE OF FLOWERS

The first day of the search for the whalehead we tried to use our aluminum boat equipped with the only outboard motor available in Nairobi. When we finally got to the lake, we found that its surface was "paved" with the flowers and pads of the beautiful Nile lotus. There were also little islands of floating vegetation and bothersome weeds, both under and above water. In the limited area that we could cover by poling, we saw no whaleheaded stork, but collected more than half a dozen specimens of other desirable birds, sufficient to keep our skinners busy that day and evening.

That afternoon we decided that native dugouts were the only effective means for whaleheaded-stork hunting and arranged for three dugouts and paddlers for the next day. These craft were leaky, tippy, and without seats, and my wife was less than enthusiastic about using them in this crocodile- and hippo-infested water. However, since it was the only way of reaching the whaleheaded stork and other desired specimens, she solved our seating problem by making use of a soundly constructed empty Coca-Cola crate about eight inches high.

The next morning Williams drew another picture of the whaleheaded stork for our boatman, the lone Swahili-speaking native, again emphasizing the bird's bill and big head. Some hours later there was much

(*Continued on page 4, column 2*)

FINISHING TOUCHES ON NILE GROUP

Staff Taxidermist Carl W. Cotton attends to highlighting a lily-pad before placing it on the murky water of the Nile marshland scene. At the time this photograph was taken the exhibit was complete except for a few details.

THE EXHIBIT

By AUSTIN L. RAND
CURATOR OF BIRDS

IN THE MUSEUM'S hall of habitat groups of birds (Hall 20), across from the rhea, which stands over its hatching eggs on the South American pampas, and alongside a group of ruffs that are going through their mating displays on a meadow in Holland, a whalehead and a trio of crowned cranes now dominate an African marsh that is teeming with bird life. This is the Nile group, most recent addition to the hall, which features three other African scenes: one of a rain forest, one of a desert, and one of a colony of village weaverbirds.

The scene of this new group is Lake Kyoga on the upper Victoria Nile, just below where it flows out of Lake Victoria in Uganda, eastern Africa. The birds that could have been selected to go into the group are many, but two real Africans were chosen to be the central figures—the whaleheaded stork and the crowned crane. The whalehead, related to the stork, is the sole species in the family Balaenicipidae with a distribution restricted to the swamps of central Africa. It is a somberly colored grayish bird with a huge bill and a curious pert crest. Its home is in the big marshes, and one of its favorite foods seems to be lungfish. Being such a large bird (standing about 40 inches high), it is surprising that it was long overlooked by students of African birds, but when one considers the difficulty of penetrating the deep swamp where it makes its home, the scant knowledge of it becomes understandable. Because it is usually a solitary bird, we have placed a single individual standing near the right front of the case. (See cover illustration.)

THE CROWNED CRANE

The other African bird chosen to share the focal point in the case is the crowned crane. Contrasted with the whalehead it is a graceful, active, beautiful, and well-known bird. The straw-colored crest recalls in a curious way the fruiting head of a papyrus—the wattles are crimson, the bare cheeks white and crimson, and the plumage gray, ornamented with big patches of white and maroon in the wings. The bird is gregarious—flocks of several hundreds have been recorded, and as many as 1,000 birds have been seen in a twenty-minute flight past a camp. They frequent grain fields where, in addition to eating insects, they dig up grain, and they have a habit, common to many cranes, of dancing. Consequently the

crowned crane is well known and has even been pictured on the postage stamps of East African countries.

When the material collected by the Buchen Expedition for this group arrived at the Museum from the field, Staff Taxidermist Carl W. Cotton took over. There were the birdskins, the plant accessories, and a Nile book of sketches made and colored by Dr. John Williams, of the Coryndon Museum in Nairobi, to show what the fresh specimens looked like. The papyrus that had been doubled up into boxes and dried was straightened out, soaked, a wire run through the stem for rigidity, the head fluffed out, sprayed with oil paint, and the stems waxed. The lily-pads that were to cover so much of the water's surface were wrinkled and brown, looking like a stack of pancakes as they came out of the packing. They were soaked, plaster molds made from them, and then green wax reinforced with cheesecloth provided replicas. The lily-buds were made the same way: plaster molds and casts. The flowers presented a special problem. The pinkish-blue petals, yellow stamens, and green sepals were cut separately from paper and dipped in wax of the appropriate color and laboriously assembled by hand. Grasses were treated and arranged into life-like clumps, mud islets were made, and plexiglass chosen and cut for the water. So much for the accessories that were to occupy the half-moon-shaped floor space, almost 14 feet wide and 10 feet deep.

LIFE SEMBLANCE RESTORED

The birds were in the form of dry skins. Mr. Cotton's first task was to relax them with water and scrape the skins so that they were as flexible as fresh skins just removed from the bird, the feathers falling naturally in place. An artificial body was made with wires for neck and legs to hold the bird's pose, and the bird was placed in a natural position and loosely wound with thread or paper strips to hold its feathers smooth. When the bird was dry, glass eyes were added and the bill and feet painted to restore the natural colors.

While these materials were being prepared, Douglas E. Tibbitts, Staff Artist, and Leon L. Pray painted the background. With color photographs taken in the field by the Buchens to guide them, the extensive marshlands, the cloudy sky, and the distant hills materialized on the curved walls of the alcove prepared for the group.

When the background was completed, the plexiglass "water" with its lily-pads and the accessory vegetation and islands were installed, joining with the painted background so cleverly that it is difficult to see the junction. The birds were then installed, completing another habitat group in the extensive series gracing the halls of the Museum.

As the visitor stands in front of this case he has the illusion of looking out on Lake Kyoga. Ahead, the water dappled with lily-pads stretches to the horizon. To the right, lines of papyrus break the view and frame the vista. To the left marsh-grass areas dotted with a few trees or bushes appear, flanking low, distant, blue hills. A whalehead in the shade of a clump of papyrus is near at hand; three crowned cranes stand on a mud island, dwarfing a cattle heron that is a little farther off and to the left. A black open-bill stork is just beyond.

Close at hand swim a pair of pigmy geese and a crested grebe with a downy young one riding on its back. Beyond, a painted-snipe displays its ocellated wings in flight, nearer are a long-toed plover with one of its downy young, a coot, a gallinule, and, beyond, an anhinga swims toward three tree-ducks perched on a lump of mud.

In the background are herons, egrets, and ducks. More crowned cranes are on a far mud bank, and a fishing eagle circles overhead. Looking closer, one sees lesser fowl; a black rail peers from the papyrus; a malachite kingfisher rests on a lily-pad; weaver-birds are nesting in the papyrus, where a little swamp flycatcher flits.

We have shown some 22 species of birds and, without crowding the material, have tried to reproduce the impression of a swamp teeming with bird life as one would find it in Africa. But many species have had to be left out because of lack of space to show them.

THE RECORD IN PHOTOGRAPHS

Mr. Buchen is a photographer of ability and, along with the specimens and the color slides for record purposes, he brought back a motion-picture record of his expedition. There are views of Coryndon Museum, the safari, the camp, hunting and preparation of specimens at Lake Kyoga, and the birds and the people. This seemed an opportunity to make a complete film-record of the history of a habitat group, and so Mr. Buchen sponsored the making of a pictorial record of the construction and the installation of the exhibit in the Museum. Staff Taxidermist Ronald J. Lambert accepted the task of the additional photography and the editing of the whole film.

The result is gratifying. We have a complete photographic record. It starts with the planning of the exhibit in Chicago, shows the expedition in the field, the material coming back to the Museum, preparation of the material, the painting of the background, and the final installation, ending with a view of the finished case in the hall. It is a detailed record of how an African scene was brought to life in Chicago Natural History Museum.

STORY OF THE BUCHENS' EXPEDITION TO AFRICA

(*Continued from page 3*)

jabber in Kiswahili and the local dialect, and our paddler pointed gleefully at a number of pelicans. After much shaking of the head and ineffectual attempts to describe what we wanted in words, Williams drew another picture, this time emphasizing the length of the legs. Our boatman was certain that he now knew just what we wanted.

This time he was right, and great was our excitement when a half hour later we saw our first whalehead perched on a tiny mud island intent on the water below—a truly prehistoric-looking creature. As we came closer, he looked up and became restive. When we were within 75 yards, he took to his wings, but a charge of a No. 2 from a 12-gauge shotgun luckily brought him down. Williams was enthusiastic about the specimen and pronounced him a male in full plumage. He did not, however, give him his usual accolade of complete approval, namely, "Magnificent specimen, adult male in full breeding plumage," because nothing is known definitely about the breeding seasons of the whaleheaded stork. All of us were very much delighted because we had been warned that we might have to spend as much as an entire month to find the whalehead, and here we had secured an excellent specimen on our second day.

SAFARI PROCEEDS BY WATER

The Walther Buchens being piloted through a Nile swamp by Dr. John Williams. The scene is much like the one portrayed in the newly completed exhibit.

The next day we collected our second whalehead, which, by good luck, proved to

be a female in good plumage. On the third day we saw one more, which we photographed with both still and moving-picture cameras. These three were all that we saw during our days at Erima. The rest of the time was spent in collecting about fifty specimens of certain species of other birds on our list and in gathering samples of mud, vegetation, and water lilies, and shade-drying many stalks of the local papyrus.

On June 10 we broke camp and drove about fifty miles to a spot where we took a ferry across a very narrow part of Lake Kyoga. Two days later we pitched our tents at Bugondo toward the eastern end of the lake. We worked a good many swamps in this region for specimens of storks, moor hens, several species of bishop birds, and marsh weaverbirds, herons, various species of teal, painted snipe, and the beautiful crowned cranes that were to be one of the focal points of our habitat group.

IT'S A HARD JOB

Our work was always fascinating, but much of the time it was difficult and uncomfortable. The water levels were still high and often we had to wade in water above our waists through tall, thick vegetation. Trying to get within range of a bird without being seen or heard was a fascinating adventure in stalking. Shooting was often difficult because of high vegetation. Shotguns continued to be our most useful tools, although we made good use of 22-rifles both with sparrow dust for very small birds and with bullets for large specimens too far away to be reached with a shotgun. Williams could not be with us very much in the marshes because of his exacting task of skinning and preparing specimens.

The daily collecting capacity of our expedition was, of course, limited by our skinning capacity because specimens cannot be kept more than twenty-four hours and some, such as the downy young, cannot be kept overnight. Williams, however, had trained our game scout Luka and one of our gun bearers to do some of the simple skinning-work. With these two assistants and his own trained skinner, our expedition was able to utilize our lucky days to the full.

After about three weeks of collecting we had all of the specimens classified as "musts" and almost all that we classified as "desirable." Several were listed as "wanted if easy to get." Some of these were the hardest of all to find. One, the saddlebilled stork, which is the largest member of the stork family, we hunted in vain for days. We waded in marshes up to our armpits, our skins were rasped by sharp grass, we made many halts to pick leeches off our legs, we made many futile stalks, and, after one heartbreaking miss and a final long and lucky shot, we managed to get one. When we triumphantly brought this saddlebill to the skinning tent, Williams' reactions were a masterpiece of studied tact. He listened to our tale, congratulated us on the long shot, and, after careful preparation, informed us that it was an immature male and the skin was useless, although the skeleton might possibly be useful as study material. He remarked comfortingly that the saddlebill stork was not a "must" on our list. We decided that as far as we were concerned it was eliminated from our list.

GOLIATH HERON COLLECTED

The Goliath heron, the largest member of the heron family, was the next "must" we tried to secure. After many disappointments we finally managed to catch a not particularly good female and an excellent male. This completed the list of larger birds, and it was a relief to go to the smaller species, many of them very beautiful, such as the malachite kingfisher, the flame-colored grenadier bishop, the bright-red Uganda bishop, and the yellow-collared weaver. We were fortunate in getting a good collection of this weaver's nests and eggs, and my wife even found the nest and the downy young of the Kitlitz plover, both very difficult to see against their gravel background.

When we finally left Uganda, there was only one of the required smaller birds that we had not found, the male painted-snipe. The male is the drab and small member of the species. The female is large and has beautiful plumage. Our time, however, was running out and we decided that perhaps Dr. Rand at the Museum in Chicago could get along with the decorative female and not miss the aesthetically quite negligible male. On our four-day journey back to Nairobi we made camp one evening on a small body of water in the fascinating Karamojo country. When we walked down to the shore to see what there was to see, the first bird we saw was a male painted-snipe. By quick action we were able to add it to our bag, and Williams skinned it that night by lamplight.

The next day we arrived in Nairobi only a few days behind schedule. We had collected more than 170 bird specimens together with a considerable number of nests and, of course, the supplementary material and vegetation required for the habitat group.

NATURE PHOTO ENTRIES CLOSE JANUARY 16

January 16 is the final date on which entries can be accepted for the Ninth Chicago International Exhibition of Nature Photography. The exhibition, which results from the annual contest and is held under the joint auspices of the Chicago Nature Camera Club and Chicago Natural History Museum, will be open to the public in Stanley Field Hall of the Museum from February 1 to 28.

PERSONNEL CHANGES

Clifford H. Pope, Curator of Amphibians and Reptiles for thirteen years, resigned December 31 after a six-month leave of absence. Curator Pope has been preparing a popular account of the reptiles and intends to devote full time to this and other writing. He has already published several books, *The Reptiles of China* (1935), *Snakes Alive and How They Live* (1937), *Turtles of the United States and Canada* (1939), and *China's Animal Frontier* (1940).

Before coming to the Museum Mr. Pope was in the division of herpetology of the American Museum of Natural History in New York. From 1921 to 1926 he was with the Central Asiatic Expedition to China led by Roy Chapman Andrews. In 1936 he left the American Museum to devote his time to free-lance writing.

During his curatorship at this Museum his interests centered on the taxonomy and distribution of North American salamanders, the mechanics of the bite of Solenoglyph snakes, and the growth of the rattle in rattlesnakes. His *Handbook of the Amphibians and Reptiles of the Chicago Area* is an especially useful work. His field work for the Museum took him to various parts of the United States and twice to Mexico.

Curator Pope will continue his connection with the Museum as Research Associate in the Division of Amphibians and Reptiles.

Robert F. Inger, Assistant Curator of Fishes, has been appointed Curator of Amphibians and Reptiles. He joined the Museum staff in 1946 and worked in the Division of Reptiles for three years. He was then transferred to the Division of Fishes where he worked until the effective date of his new appointment, January 1.

Philip Hershkovitz has been promoted from Assistant Curator of Mammals to Associate Curator in recognition of successful completion of a four-year expedition to Colombia and other accomplishments in collecting and research. John W. Thieret, Assistant Curator of Economic Botany, who has just received his Ph.D. degree from the University of Chicago, has been appointed Curator of Economic Botany. Dr. Waldemar Meister has been appointed Associate in the Division of Anatomy. He has completed two research projects based on material in the Museum's collections and is working on additional problems in the Division of Anatomy.

Miss M. Dianne Maurer, a graduate of the University of Chicago and a former WAF officer, has been appointed secretary for the Department of Botany to replace Miss Virginia Sharp who is resigning. Mrs. Barbara Polikoff, appointed Assistant in Public Relations last June, has been promoted to the position of Associate Public Relations Counsel. Mrs. Dorothy B. Foss, Osteologist, resigned as of December 31, after more than fifteen years of service.

PAPYRUS MARSHES PROVIDED EGYPT WITH SPORT, FOOD, WRITING MATERIAL

By RICHARD A. MARTIN
CURATOR, N. W. HARRIS PUBLIC SCHOOL EXTENSION*

FAR NORTH of Lake Kyoga, along the margins of the Lower Nile in Egypt and in the Delta where the river nears the sea, there used to be papyrus marshes much like those now found along the Upper Nile in the Sudan and in Uganda. These marshes, teeming with waterfowl and fish, were rich hunting and fishing grounds for the ancient Egyptians. Carvings from mastaba tombs at Sakkarah dating as far back as the Fifth and Sixth Dynasties (2500–2200 B.C.) of the Old Kingdom show nobles and peasants who have come to the Nile marshlands to hunt and fish, the nobles for sport, the peasants for food. Similar scenes are depicted in wall paintings decorating the rock-cut tombs of later periods, the most notable being those of the New Kingdom (1545–1090 B.C.) at Thebes.

Hunting for sport was done from small boats made of bundles of papyrus lashed together. Sometimes they were paddled through the thicket of sedges and rushes growing in the shallow water, but usually they were poled about. From these boats the big-game hunter harpooned the hippopotamus. Hunting waterfowl with the throw stick or, less often, with the bow and arrow were, however, more popular sports with Egyptian noblemen. Attendants accompanied the hunters and retrieved the game and the throw sticks and arrows.

The Egyptian nobleman fishing in the marshes stood in his boat and speared or harpooned his catch. The less adventurous stay-at-homes "went fishing" with a hook, for in many home courtyards of the wealthy there were pools stocked with fish from the marshes. The lord of the house could angle at his leisure without the inconvenience of an excursion into the marshes.

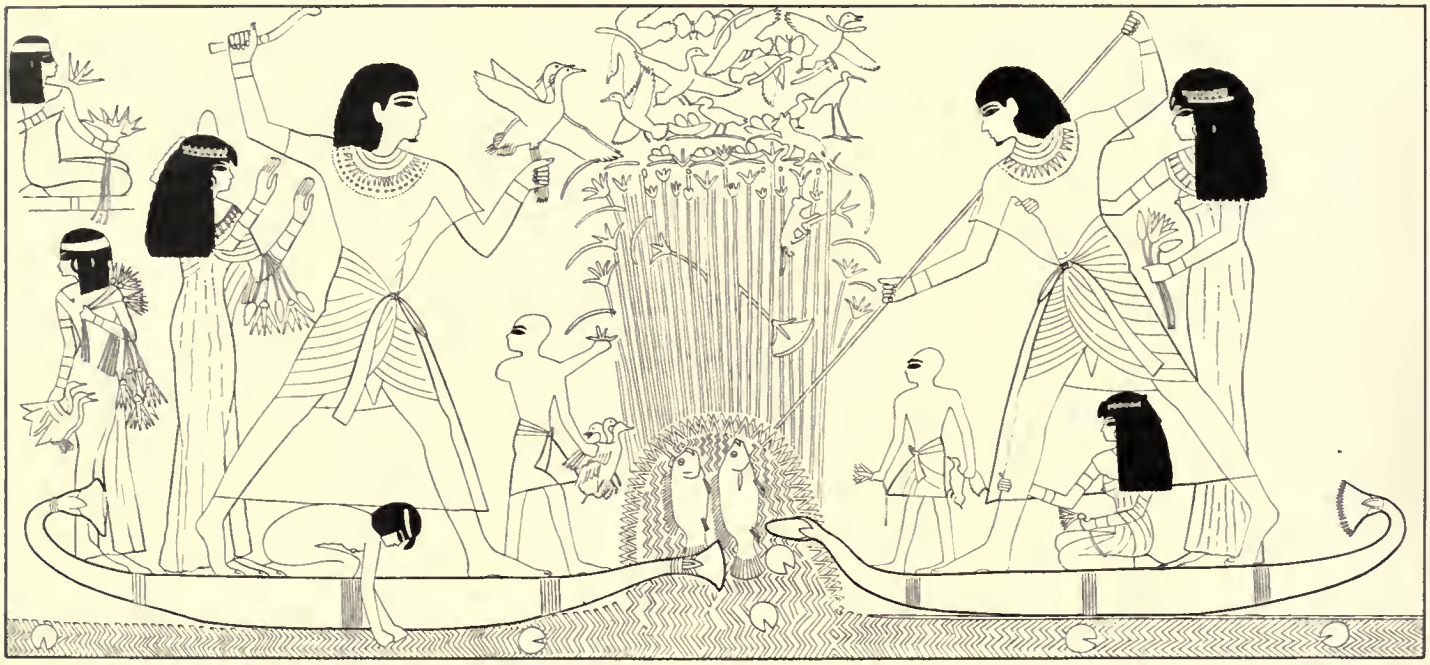
Where food rather than sport was of first consideration, the ancient Egyptians practiced hunting and fishing techniques that assured returns on a larger scale. For "commercial" fishing there were dip nets for the individual and large seines requiring the help of many men. To catch the unwary waterfowl that then, as now, flocked into the great Nile flyway, the Egyptians spread large nets and set various other kinds of traps. Many of the captured birds were kept in captivity and fattened. There are scenes that show force feeding or "noodling" of cranes and geese similar to the noodling done today for the best *pâté de foie gras*.

The papyrus we see in the Museum's group of birds of the Upper Nile is perhaps the most significant reminder of ancient Egypt. From prehistoric times down into the 9th century after Christ it played an important role in affairs along the Nile. We find it in various forms in Egyptian hieroglyphics. It became a symbol for Lower Egypt. It was pictured in the fowling and fishing scenes from tombs of various periods and was used as an important element in the decoration of buildings for the living. Perhaps the most beautiful of all Egyptian paintings that have been recovered are the papyrus murals from the walls of Akhnaton's (1380–1362 B.C.) palace at Amarna. As an architectural motif we find papyrus utilized in monumental buildings in the form of columns.

The real importance of papyrus for almost 4,000 years was, of course, as a writing material. An unused roll of papyrus was found in the tomb of a First Dynasty king (about 2900 B.C.), and several small documents of written-on papyrus date from the Fifth and Sixth Dynasties. Almost from the time when men learned to write, papyrus was the most important writing material throughout that part of the civilized world that did not write on clay. During the Graeco-Roman period papyrus was a major crop of Egypt. Prepared for writing it was exported in enormous quantities.

Parchment (the skin of sheep and goats) and vellum (the skin of calves and kids) became competitive writing materials in the 2nd century after Christ but were never so important as papyrus. In the 8th century, however, the art of making paper from linen and flax was introduced into the Near East from China, and by the end of the 9th century that industry had made its way to the Delta. At the close of the 10th century paper had entirely replaced papyrus in the Moslem world.

But 5,000 years of a constantly expanding agricultural economy have drained away the lush papyrus swamps of ancient Egypt. Today the papyrus plant is found only in botanical gardens and in remote reaches of the Upper Nile.



In this scene from a wall painting in the tomb of Menna (Thebes, New Kingdom) the owner of the tomb accompanied by members of his family is shown on a hunting trip to the marshes. On the left, Menna is aiming at waterfowl with a throw stick, and on the right he has a spear poised for fish. The small boats were made of papyrus lashed together. The drawing by Douglas E. Tibbitts, Staff Artist, is made from Davies' and Gardiner's "Ancient Egyptian Paintings."

* Former Curator of Near Eastern Archaeology.

A MID-MOUNTAIN FOREST IN THE PHILIPPINES

By AUSTIN L. RAND
CURATOR OF BIRDS

I'VE JUST COME BACK to Dumaguete City after a week in the tropical mid-mountain forests of Negros Island. There I woke at dawn to hear jungle fowl crowing, big pigeons booming, and leafbirds singing, and at dusk monkeys squalled from the forest edging the camp clearing as the frogs began their evening chorus. I lived in a camp just below the summit of the "Horns of Negros," the twin peaks that dominate the mountains of southern Negros.

Photo by D. S. Rabor

THE 'HORNS OF NEGROS,' PHILIPPINE PEAKS

After the meetings in Manila of the Pacific Science Congress I came down to the central Philippines where the Chicago Natural History Museum Field Associate, Dr. D. S. Rabor, is head of the Department of Biology of Silliman University. Dr. Rabor met me at the plane, had me stay with him, and arranged for me to stay in this Cuernos de Negros camp that he maintains for periodic field work by his biology classes. He not only arranged it, but saw me comfortably installed, with cook, personnel, supplies, and equipment, and he stayed a night to see that all functioned smoothly.

Seldom can one talk long in the Philippine Islands without reference to the recent war. This camp is no exception, for it is in the clearing where Dr. James W. Chapman, ant specialist of Silliman University, lived for eighteen months after the occupation before the Japanese found him and sent him to Manila for internment.

Eastern Negros is a country of small farmers of coconuts and corn, heavily settled. From Dumaguete we look up, in the early morning, to see the forested "Horns of Negros." For the rest of the day it's usually cloud covered. We climbed up nearly 3,000 feet through the hot, sweltering foothills, through coconut groves, banana groves, sweet potato and corn fields, and abaca plantations (which yield Manila hemp). With our lunch, along the way, we had fresh coconut milk (one of the advantages of living in the tropics, Rabor says) and also toba. This last was quite new to me, but it seems widely used in Negros. The inflorescence of the coconut is cut and a bamboo tube is attached to collect the juice. Near each house we passed we saw the tubes in the coconut palms. Each morning the men climb to gather the juice. Fresh (slightly fermented only, as we had it), I found it recalling hard cider, flavored with things I couldn't name. Rabor says a powdered bark is put into it—and also insects, rats, and even bats and lorikeets come to drink from the tubes, fall in drunk, and drown. If kept for two days its alcoholic content is greatly increased and caution is required.

At 3,000 feet we were in the forests, and at 3,700 in the camp. Rabor and I climbed to the top of the North Horn of Negros, which is nearly 6,000 feet. It starts out as a moderate slope with fine tall forest, with ferns, tree ferns, low palms, and moss common. Halfway up it steepens. Coniferous trees come in, and great rocks moss covered and gripped by aerial roots and scrambling pandanus are conspicuous. We clambered up with hand and toe holds past mossy caves and passages. We grasped at mossy trunks that looked to be six inches in diameter to find them one-half inch in diameter and the rest moss. A misstep on a pandanus-leaf mat sent a leg through into space. When we finally reached the top, a mass of aged dwarf conifers, pandanus, tree ferns, palms, and moss, we found the clouds had closed in below us. There was no view. We were above the clouds and it was like being on a small forested island in a frozen sea of white.

Photo by D. S. Rabor

MID-MOUNTAIN FOREST INTERIOR IN THE PHILIPPINES

Though wet enough now, with water in the streams and the moss like sodden sponges, this is the start of the northeast monsoon, which is dry, and in February and

(*Continued on page 8, column 1*)

DALLWIG TO DRAMATIZE TRIP TO THE MOON

Paul G. Dallwig, the Layman Lecturer, will take his audiences "out of this world" in his first dramatization of the season, "A Trip to the Moon—Why Not?" to be given at 2 P.M. on January 3, 10, 17, 24, and 31. The possibility of such a trip seems much more likely now that scientists have managed to contact the moon by radar, and Mr. Dallwig takes into account all that science knows so far about what might be expected on a trip of this kind. The dramatization is divided into three scenes: "The Take-Off," "The Trip to the Moon," and "A Day on the Moon." Mr. Dallwig will also explain the difference between comets, meteors, and meteorites, whether flying saucers are fact or fantasy, and other topics connected with outer space.

Museum Members are admitted to these lectures upon presentation of their membership cards; others must make reservations in advance by mail or telephone (WAbash 2-9410). There is a half-hour intermission for refreshments in the Museum cafeteria at 3. The programs begin in the Lecture Hall and progress into exhibition halls containing material that Mr. Dallwig uses to illustrate his dramatizations.

In February Mr. Dallwig's subject will be "Life—What Is It?"

Illinois Audubon Society Offers Screen-Tour of Mexico

"Land of the Scarlet Macaw" is the title of a free screen-tour to be presented in the James Simpson Theatre of the Museum on Sunday, January 17, at 2:30 P.M. under the auspices of the Illinois Audubon Society. The films to be shown survey the natural treasures of Mexico in all their color and variety. The accompanying lecture will be by Dr. Ernest P. Edwards of Amherst, Virginia. The scenes recorded by his camera range from the summits of mountains and volcanoes to picturesque markets in isolated villages deep in hidden valleys.

PHILIPPINE REPORT—

(*Continued from page 7*)

March there is no water to be had on the mountains. On the lower slopes we found a "mixed bird party." A blue-and-cinnamon fantail flycatcher that was perching and calling conspicuously in the van was the leader, Rabor said. In this party were scores of white-eyes, a chickadee, a nuthatch, bulbuls, and leafbirds, and probably others. The drongos do not join these parties but, instead, associate with monkeys, perhaps for the insects they stir up, as cowbirds associate with cows in our country.

I was especially pleased to see on these slopes of the Horn a babbler that Rabor and I described as new to science some years ago when he was in Chicago. At that time neither of us had seen it alive. Now we both watched its actions, noting its rather undistinguished manner of poking about twigs and branches searching for its food, as do so many generalized songbirds.

Negros Oriental, contrasted with some other parts of the Philippine Islands just now, is very orderly. The people with their small farms believe in law and order and protection of property. We can wander freely. But there's one thing to watch out for, Rabor warns me: it's best to have a native guide—to keep me out of pig traps. These traps, with the aid of a bent sapling, send a spear across a trail with the object of transfixing the pig. The spear is ordinarily aimed knee high, and Rabor says that as I'm rather tall the spear would probably catch me in the upper calf. Next time I went out I located four abandoned pig traps along a trail I had passed a number of times earlier without seeing them.

In the camp clearing grow raspberries, as big as the end of my thumb, on canes fifteen feet or more long so that some dangle out of reach overhead. They're a bit dry, compared with our northern berries, but they have the same "stink-bugs" that have ruined many a mouthful of berries for me in the United States.

This is the change of the seasons, with variable weather: some days are fine, some the rain drips endlessly from sodden skies. Days when the mists roll in at noon are like twilight, and the frogs evidently think it is, for they start their "evening" chorus then. Then it is that the big pigeons become conspicuous. Singly or in pairs, they glide down the ridges with a sizzling sound, or circle about with whistling wings. These are the birds that pigeon hunters come up here for, from the valleys below. Firearms being outlawed, they're armed with airguns, but such airguns as I've never seen before. They're made locally, of brass, and it takes all a hunter's weight to work the pump. They're evidently effective, for the other day one hunter had three pigeons. A yellow-flowered ground orchid, common here, is evidently prized for gardens below, for one day we saw three small boys with baskets of them, evidently transplanting them to gardens.

At times, especially when the clouds roll in, this country seems remote and lonely. But we're continually being reminded that it's not. Trails of pigeon and orchid hunters lead everywhere; the bamboo tapping "talk" of the villagers below comes up clearly, the sharp tapping of two pieces of dry bamboo struck in varying rhythms that seem to convey ideas if not actual messages; we're continually finding little heaps of pigeon feathers, proof of some hunter's prowess; and when there's a rift in the clouds we see the nearby islands of Cebu or Siquijor. Like most forests near settlements, this one is being encroached on, cleared for abaca plantations. And in the dry season fires can eat into its edges. So far, the ruggedness of the terrain, a welter of knife-edge ridges, has saved it. But the country is on the way to the deforested condition of nearby Cebu, which I saw from the air.

Our cook was willing, but inexperienced. One day our hunters returned in high glee with five monkeys. After the skins were saved for the Museum, the cook was instructed in preparing monkey meat for the plates (we had no table). The meat was cut in chunks from the bones, boiled for a bit, then fried for a while. As the cook turned the pieces in the pan he found them coated with loose monkey fur. So for a long time he sat, turning piece after piece in the frying pan, picking off monkey fur. Monkey meat, fresh from the monkey to the frying pan to the plate, may be a little tough but it's rich tasting and flavorful. And rice fried in the fat left from frying monkey was especially tasty.

The question of language is beyond me in the few weeks I have been here, I'm afraid. Fortunately, English is pretty widely understood. Indeed it is the official language of instruction in the schools (with Tagalog the second official language). Here with the people talking amongst themselves there are occasional English words like "sleeping bag," occasional Spanish ones like "carne" for meat, and for the rest it is not Tagalog, but Visayan, the native tongue of the central Philippines.

Daily Guide-Lectures of Museum Exhibits

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

4-H Tribute to Museum

A 4-H Donor Merit Award has been received by Chicago Natural History Museum in recognition of its 33 years' support of 4-H Club work. The award was presented by the Co-operative Extension Service and the National Committee on Boys' and Girls' Club Work on the occasion of the annual National 4-H Club Congress in Chicago.

When I wrote by the light of the kerosene lamp in the evening the assortment of moths that came to the light was considerable. Especially noticeable among the silvery ones and the gray ones was a white one with pink bars and a pale green one. And just as conspicuous were the hemipterous bugs in varying patterns of black, yellow, and orange.

Particularly in mountain forest, the first days are discouraging—the terrain is so rugged, the trails are all so slippery, the vegetation is so dense and dripping, and the birds get about with so much more ease than I do. But my legs are now hardened to the hills. I look before I step. The dripping wet I'm used to now, and I've begun to know where the birds will be, where there's a special bulbul grove a few hundred yards down the trail, where there's an attractive fruiting tree just beyond and a little saddle in a ridge that birds favor, and so on.

It's interesting how much more satisfactory some birds are to watch than are others. For example, one evening in the mountains a flower pecker and a velvet-fronted nuthatch came into the tree edging the clearing. The flower pecker perched on a slender branch of a second-growth tree. It was a male, about three inches long, orange below, blue above, with a red spot on mid-back. Short-billed, short-tailed, it sat, like a dumpy ball of feathers, quite still, for perhaps ten minutes, then flew away. My knowledge of it was increased only in knowing that the species is very inactive.

How different was the nuthatch. It came into a branching tree, lit low, hopped up one branch, head up, looking this way and that, then across to another branch, then came down that headfirst, now belly down, now back down, as it followed the twisting and the turning of the branch. In two or three minutes it had showed me its bag of acrobatic tricks, typical, quick, active nuthatch behavior, and was gone, leaving the flower pecker still sitting soggily.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 2 - February 1954
Chicago Natural
History Museum

9th Chicago International
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February 1—28

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Members are requested to inform the Museum promptly of changes of address.

JOHN T. PIRIE, JR. NAMED TRUSTEE; OFFICERS ELECTED

John T. Pirie, Jr., has been elected a Trustee of Chicago Natural History Museum to fill the vacancy caused by the death last year of Albert H. Wetten. Mr. Pirie, president of Carson Pirie Scott and Company, was simultaneously elected a Corporate Member of the Museum. A participant in many Chicago civic organizations, Mr. Pirie is active in the Chicago Crime Commision, the Child Welfare League, Junior Achievement of Chicago, the Salvation Army, and St. Luke's Hospital.

John T. Pirie, Jr.

Samuel Insull, Jr., was advanced from Third to Second Vice-President and Joseph Nash Field was elected Third Vice-President at the Annual Meeting on January 18 of the Board of Trustees. Stanley Field was re-elected to the office of President for the 46th consecutive year. Other officers re-elected are: Marshall Field, First Vice-President; Solomon A. Smith, Treasurer; Colonel Clifford C. Gregg, Director and Secretary; and John R. Millar, Assistant Secretary.

EXPERIMENT IN ISRAEL: NATURALISTS AS TEACHERS

BY KARL P. SCHMIDT
CHIEF CURATOR OF ZOOLOGY

ONE of my several hosts during a recent stay in Israel was the Biological Pedagogical Institute of Tel Aviv. I had known something about its naturalist director, Dr. Heinrich Mendelssohn, through my colleague Professor Georg Haas of the Hebrew University in Jerusalem, but I had no understanding, before my arrival in Tel Aviv, of the nature of the Institute. Dr. Mendelssohn proved to be one of the most competent and enthusiastic naturalists I have known, with an extraordinary command of the whole range of Palestinian natural history, including both plants and animals, their natural associations, their geographic distribution, and, as to the larger animals, a detailed knowledge of their behavior.

The Institute turned out to be in the main a small zoo in which almost every one of the larger animals of the Palestinian fauna is to be seen. This collection is supplemented by preserved specimens, a sort of small museum appended to the zoological garden. The quarters in which the animals are kept are extremely crowded. Cages are often piled three or four high, with only the narrowest separating passages between. These quarters would be entirely inadequate, were it not that Mr. Mendelssohn and his assistants are imbued with the traditions of natural keepers of live animals, to whom no effort is too great to maintain their charges in health and in essential happiness. "Happiness" of animals in a zoo consists of an adjustment to cage life and, much more vitally, an adjustment to the keeper. It is difficult to avoid the word "love" for this relationship. Successful adjustment certainly lies specifically in confidence and the feeling of security. At any rate the animals *are* in good condition, and this is especially attested by their mating and breeding in captivity, as many animals in the largest and best-kept zoos may fail to do.

Here at our first stop in Israel, I was able to see the gazelle and ibex of the southern deserts; the wild boar of the northern marshes; the striped hyena, still found on Mount Carmel; the widespread jackals (running free between the cages as scavengers); the array of native hawks and vultures; the water birds and waders; and among the snakes and lizards and turtles the species that I had long known as museum specimens but never before had seen in their natural coloration and in their own modes of locomotion and behavior.

Here in Tel Aviv, then, is a small zoo, focused on the native fauna, and quite closed to the public, so that even children are admitted only after proved ability to share the burdens of cage-cleaning and feeding. What is the function of such a collection, kept at so great an expenditure of time and effort? The zoo is maintained as a means of teaching natural history to the students of the Institute, which prepares teachers for the elementary and secondary schools of Israel. It is a tool used to teach the teacher-trainees. It is not for children, or for the general public, or even for the graduate teachers. Its program was started by Professor Jehoshua Margulin, who, a generation ago, found the prospective teachers learning natural history from German or English textbooks and wholly ignorant about the native life of Palestine. He set about remedying this situation first of all by making a radical change in his own life, from a characteristically rabbinical and bookish training to the life of a field naturalist. This took him back to Europe for zoological studies and then again to Palestine to introduce the teaching of teachers by the use of living animals. His success is reflected in the rise of the small outpost museums that are now to be found, literally from Dan to Beersheba.

I believe that the "Museum Idea" so captures the imagination of the teachers trained at the Biological Pedagogical Institute that another generation will see in Israel the most museum-minded population, with the largest proportion of enthusiastic naturalists, of any country in the world.

THIS MONTH'S COVER

Photographer Yu-chiu Cheung of Hong Kong has managed to give the photograph, "Silver Twins," reproduced on our cover, a delicacy of line that suggests a Chinese print. The fish are one of the silver-colored varieties of goldfish. Mr. Yu-chiu submitted this photograph for the Ninth Chicago International Exhibition of Nature Photography, which will be held by the Chicago Nature Camera Club and the Museum in Stanley Field Hall from February 1 to 28, inclusive. A full account of the exhibit of photographs is on page 5.

Daily Guide-Lectures

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WHAT THE GROUNDHOG UNDERGOES TO MAKE A 'HOLIDAY'

By PHILIP HERSHKOVITZ
ASSOCIATE CURATOR OF MAMMALS

FEBRUARY 2 is Candlemas Day and Groundhog Day. According to tradition the weather on this day is very important because it is an omen of good or bad luck for planting and sowing. The groundhog, also known as woodchuck or marmot, is the medium through which the meaning of the hidden knowledge is revealed. On this fateful day, the woodchuck breaks its winter sleep and leaves its den. If the day is clear and the animal sees its shadow on the ground, it hurries back to the burrow for six weeks more of hibernation. This means that spring will be late and the crops poor. If the day is cloudy and no shadow is cast, an early spring with a good harvest is foretold, and the groundhog stays abroad. This brings up the subject of how the woodchuck prepares itself to enact the role of an oracle.

Throughout the summer, the groundhog fattens itself in anticipation of winter's scarcity. When ready for hibernation, it selects a suitable den. This may be a burrow in the woods, the hollow base of a stump, or a hole along a hedgerow. Usually, the entrance to the den has a southern exposure and the nesting chamber, unless it is a well-insulated haystack, is deep enough to be below the frost line. Accommodated in its nest, the woodchuck goes into a state of deep hibernation, or torpor, by steps lasting several days, even weeks.

Cartoon by Margaret G. Bradbury

HIS DAY (FEBRUARY 2)

HOW IT ACHIEVES NIRVANA

First, a sluggishness engulfs the animal. This is followed by drowsiness that may lapse into a light sleep or revert to sluggish wakefulness. The woodchuck seesaws between these preliminary stages for several days and may even return to a very brief period of activity. Finally, it curls up into a ball and passes from the dormancy of a warm-blooded animal to a condition of torpor analogous to that of a nearly frozen reptile or amphibian. The temperature of the woodchuck drops from a typically normal mammalian 98° or 99° Fahrenheit, to 60°, 50°, or even a low of 36°, the exact temperature depending on that of the surroundings. The drop in body temperature is protracted over the course of days, sometimes weeks, and is broken by a series of small rises. It adjusts itself finally to within a degree or two of the environmental temperature.

At the same time the heart rate drops from a minimum of 80 beats per minute to as few as 4 or 5. The respiratory rate also falls from an active 140 per minute and a quiescent non-hibernating 25 to 30 to an almost unbelievable low of less than one complete respiratory cycle in five minutes. One per minute is, however, the average rate of respiration in hibernation. All other vital functions follow suit and the animal becomes stiff, cold to the touch, and seems to be dead. Nevertheless, the groundhog continues to give off perspiration and heat, though in such minuscule quantities that their production can be detected only with special instruments. This is in marked contrast with the condition of bloodless and coldblooded organisms, whose vital functions are completely suspended during hibernation.

The woodchuck in torpor is not really so unconscious as it seems. It can easily be induced to waken by handling, by warming its chamber, or by other mechanical means. Certain internal stimuli, such as a weak sensation of hunger or the urge to mate, may cause the woodchuck to return to a state of normal wakefulness and may even impel it outdoors for a brief excursion that could possibly coincide with Candlemas Day. The process of waking is rapid and violent. The temperature rises from the hibernation level to approximately 98° in a matter of minutes or, if the difference is great, within an hour or two. The heartbeat increases in speed to more than 200 per minute and the rate of respiration to above normal basal level. All these processes take place concurrently with a rise in heat production that is almost explosive. Fat is the source of the energy expended in waking and leaving the nest.

Such interruptions of deep hibernation during the five or six months of the cold season are frequent and of short duration. After the first of such awakenings the woodchuck regains the torpid condition within a few hours, certainly within a day, and with little or none of the fluctuations in temperature and rate of vital activities characteristic of the initial process. As days grow longer and warmer and green shoots begin to appear, the groundhog wakes more frequently and spends more time in outdoor wanderings. When in one of these forays it meets its mate, hibernation for the season is over.

The existence of specified external factors that certainly oblige the woodchuck to enter hibernation has not been conclusively demonstrated. Low temperature, scarcity of food, and dryness have been suggested but none of these hold. It is no colder in September and October when the groundhog goes into hibernation than it is in March and April when it comes out. Similarly, food is far more abundant in late summer and early fall than in late winter and early spring. Normally, humidity is as high, if not higher, in fall than it is in summer. Laboratory experiments confirm that these external factors as well as others, such as light, darkness, confined air, etc,. have no direct effect in inducing torpor.

Undoubtedly, the woodchuck enters hibernation in compliance with an inner urge to fulfill a necessary part of its annual life cycle at a certain time. During the late summer and early fall the body of the woodchuck fills to capacity with energy in the form of fat. Its reproductive organs however, stay latent until spring. Nevertheless, the device of hibernation provides the means for carrying over to the next season with a minimum of loss the accumulated energy needed for the breeding season.

THERE'S AESTIVATION, TOO

The concept of hibernation, defined as the act by an organism of passing a period

of time in a state of torpor, can include stages in the life cycle of a shrub, an amoeba, and a hookworm, as well as a frog, a woodchuck, and a host of other plants and animals. Contrary to the implications of the term, hibernation is not restricted to the calendar winter. Many plants and animals start hibernating before the end of summer and continue in a state of torpor through part of spring. In the tropics and even in high latitudes, a long dry summer is characterized by a multitude of hibernating or, as it would be called in this case, aestivating plants and animals. Thus, the crucial part of hibernation is neither the time nor the place but the kind of suspended animation assumed by the organism.

In birds and mammals, complete suspension of vital activities means death. The definition of hibernation in the case of warm-blooded animals must be modified, therefore, to indicate a state of torpor acquired through a profound decrease of heat production accompanied by a lowering of body temperature to within a few degrees of environmental temperature. This physiological condition of hibernation, which must be reversible, rarely obtains in birds, the one authentic example being the poor-will, and is found in few species of mammals, none larger than the woodchuck. True mammal hibernators include some species of temperate-zone bats, the hedgehog and African tenrec, the ground squirrel, chipmunk, prairie dog, jumping mouse, pocket mouse, jerboa, hamster, and dormouse. The spiny anteater of the Australian region is a true hibernator but whether or not its relative, the platypus or duckbill, of Australia and Tasmania can be so classified is not certainly known.

A number of carnivores, notably the bear, skunk, badger, and raccoon, are said to hibernate. These animals can pass through the preliminary hibernation stages of sluggishness, drowsiness, and dormancy as described for the woodchuck, but no farther. They can become completely passive but they never descend to true torpidity. With them there is no appreciable lowering of body temperature and they continue to produce enough heat to remain warm to the touch. All breed before or during the hibernation period and the female bear even produces and suckles her young during the winter. It seems then that compared with the woodchuck and other true hibernators, the bear, badger, skunk, and raccoon pass the winter in a state of relaxed, rather than partially suspended, animation.

Whether or not the woodchuck makes the traditional meteorological test on the second day of February, the devotees of Groundhog Day will not allow the fete to pass by unobserved. We suspect that while weather conditions at one end of the county may let the groundhog cast its shadow, the overcast at the other extreme might make for a different story, but still a story that has become a cherished part of American folklore.

BIRDS OF BALINSASAYO LAKES IN THE PHILIPPINES

By AUSTIN L. RAND
CURATOR OF BIRDS

THE COASTAL RANGE of eastern Negros is volcanic. On its jagged crest is a ragged, cup-shaped depression, little more than a couple of miles across, in which, side by side, lie the two Lakes Balinsasayo at an altitude of about 3,000 feet. Here Silliman University has a biology station, a lakeside house where I spent a week. From the crest I could look out to the islands of Cebu and Siquijor, the Straits of Cebu, and the Visayan Sea, and, dimly visible only on good days, Zamboanga far to the south. Inland the view was over rough, wooded slopes and peaks (that reach 4,500 feet) with some of the most magnificent forest trees I've seen anywhere.

The fading of daylight in the deep little mountain valley where the station stands comes suddenly and early. Our house was in evening shadow by 3 P.M., and it deepened to twilight while the sun was still shining on the slope opposite. I watched the evening happenings. First hornbills crossed high up, from valley wall to valley wall, on their way to some sleeping place; then spine-tailed swifts paid an evening visit and passed on. By 5:45 the first of the small bats appeared. Not until 6 P.M. when dusk had deepened did medium-sized fruit-bats come to feed in their favorite tree near camp. Strangely they did not stop and feed but seemed to hover only a moment, snatching a bite here and there, on the wing. Later, about 7:30 of a moonlight night, I returned to see if they had settled down. But no, the medium-sized bats were still feeding in the same way. However, two big fruit-bats, real "flying foxes," had come into the trees and were feeding as I expected them to—resting in the trees, snarling, and sending down showers of fruit and seeds.

EXCLUSIVE TREE CAFETERIAS

Fruiting trees of many sorts bearing various-sized fruit are common here. They provide food for a great many birds as well as the bats. We found seven species of fruit-eating pigeons, a hornbill, and two flowerpeckers that depend on fruit, as well as many others that do so occasionally, but strangely there are no favorite trees to which great numbers of species and individuals come. Perhaps it's the very abundance of such trees here that makes the concentration about one tree, so striking a feature of the lowlands, unnecessary in these mountains. Another point is that certain fruit trees are used by only one or two species. For example, the fruit trees fed in by fruit-bats at night were not frequented by any birds in the daytime. Another, a small-fruited tree, was frequented only by bulbuls while I watched. Does the abundance of fruiting trees allow each species to choose its own kind of tree, too?

There was only one flower-feeder, a sunbird, at this camp. This reflects a general condition of the Philippines, compared with New Guinea, for example. In the Philippines fruit-eaters are common, but flower-feeders few; while in New Guinea flower-feeders (including a species-rich family of honey-eaters, many brush-tongued lories, and a couple of sunbirds) are as plentiful as fruit-eaters. Is there a difference in Philippine flowers that has discouraged flower-feeding specialization, or is it a zoogeographical accident?

In my experience, tropical flowerpeckers (tiny, short-billed, mostly brilliantly colored birds) have little to do with flowers, despite their name, and are mostly fruit-eaters. I spent some time watching an orange-breasted species. It was always a stolid, inactive bird, even when feeding in a fruit tree. Then, one day I got a surprise when I saw one of these birds moving actively about the twigs and leaves of a tall forest tree, as sprightly as any leaf warbler.

This brought to mind the two very different aspects of the diet of these birds and of corresponding modification of the digestive system. They eat fruit and also insects and spiders. The spiders pass down the gullet, into the stomach, and then into the intestine, as is normal for birds. With fruit it is otherwise. Berries are swallowed whole. These pass down the gullet, bypass the small stomach entirely, and go directly into the intestine. Apparently no stomach action is necessary for the intestines to extract the nourishment from the fruit, and the stomach has been modified accordingly. I wonder if the two types of activity, the lethargic and the sprightly, are also correlated?

PROTECTIVE FACTORS

Time after time as I've looked up into the forest trees my eyes have been captivated by the yellow belly of the elegant titmouse, the orange-yellow underparts of a flowerpecker, and the rich yellow venter of the canary flycatcher. They're certainly advertising colors. Hugh Cott, British biologist, showed that, in general, bright-colored birds are poorer in flavor than those whose colors are concealing in effect, and it is reasoned that this is a protection against predators that otherwise might be attracted by the bright colors. Cott worked mostly with north-temperate forms. I wonder if the same is true of birds of the tropical forests? Or, as is perhaps also true of coral reef fishes, is it that the protection of their habitat, the dense masses of foliage (as of coral) with many hiding places, have allowed

(*Continued on page 5, column 1*)

COLOR PICTURES IN 3-D OF MUSEUM EXHIBITS

Three-dimensional color pictures on slides that preserve vividly the reality of the Museum habitat groups will be available for purchase in the Museum Book Shop about the middle of February. A viewer that brings out the full depth and color of the slides will also be available. The first group of slides, now completed, is called "Animal Adventures." In this group there are ten series of slides, each series containing six different views of animals in places such as Africa, India, and southeast Asia. There are plans for filming future series on birds, American Indians, and other subjects of interest to those who want to build a slide library that encompasses the world. The slides are particularly desirable because it is too difficult for the Museum visitor to make his own photographs without special equipment.

BALINSASAYO—

(*Continued from page 4*)

colors to run riot, uninfluenced by predator selection? Perhaps at my next stop, in Amio, I will have a chance for some observations along the lines of Cott's.

I've just had my first view of a monkey in a treetop. Hitherto, to me, monkeys in the wild have been voices, or confused, rapidly moving shapes in the treetops. But today traveling along the lake shore by canoe, I looked up to see a monkey sitting quietly on a big branch just above me. Through my binoculars I watched him tug thoughtfully at his beard (or it may have been her, for females wear beards, too) and scratch his back, before melting back into the leafy verdure. It had looked exactly as I'd expected a monkey in a treetop to look and, as realization so seldom accords with expectation, it's worth noting.

TRICKY OUTRIGGERS

There must have been on our lake, a dozen "bankas," as the little dugout canoes with an outrigger on each side are called. Some were small, barely 10 feet long. No one walks anywhere; even tiny children paddle. From the perspective of our camp these little craft with their outriggers, scurrying about the lake, called to mind the long-legged water insects known as water striders. These bankas are easy to manage really, with the typical steering twist at the end of the paddle stroke. They're difficult to upset but not foolproof, as I found when I tried to launch myself in one not big enough for my weight and found myself standing waist deep in water, with the banka on the bottom under my feet.

Mudfish have been introduced into these lakes and thrive in the algae-filled water. They're taken in set lines, tied to sticks 3 to 6 feet long that lean over the water. These set lines completely rim both lakes at 10-to-15-foot intervals, and in landing a banka anywhere one has to watch not to hit them. They're all the property of the caretaker of the station, and he says the fish get as long as your arm. To my own knowledge they get to be 14 inches long, for I caught several of that length.

Though we didn't feel it here in the Philippines, we could tell it was wintertime farther north, from the migrant birds we saw. In numbers either of species or of individuals they didn't compare with the great numbers of winter migrants that go from North America to Central America in comparable latitudes. But here on our lake some were conspicuous. Most noticeable was the swallow, the Old World representative of our barn swallow, that comes here from Asia. They feed over the water, and perch, 40 to 60 strong, on the branches of a dead treetop that has fallen into the lake near camp. Gray wagtails were the next most conspicuous. They're silm, elegant birds of gray, yellow, and white that haunt the water's edge catching insects. When agitated, they move not only the tail but the whole hind part of the body up and down, a trait that has given them not only the English name wagtail but also the scientific one of *Motacilla*. Among the other migrants should be especially mentioned the kingfisher of Eurasia, little larger than a sparrow and with a vivid blue back. It perched on the fish poles of the set lines and, when disturbed by me, made little moves not of its tail like the wagtail but of its head in an up-and-down bobbing motion. A sandpiper, like our spotted sandpiper but without the spots, a brown shrike, a tree pipit, and a grass warbler completed the list of migrants seen here.

REFUELING IN FLIGHT

The ecological segregation of the swallow and the cave swiftlets that feed in much the same way, catching insects in the air while the birds are in full flight, is interesting. The swallows feed chiefly low over the lake; the swiftlets feed about the tops of the forest trees. Obviously each could find ample food in either place, but would it be of the same kind? Or is the difference psychological—do they simply "like" different kinds of places?

On one little arm of the bay I found a place where the remains of many small moths had accumulated. It was a band of floating moth-wings on the water's edge. The band littered with these wings was about 12 feet across and several yards long, blown in by the wind. In one eight-inch circle there were about 50 individual wings. Evidently a great variety of species was represented, as their colors varied: pink, tan, brown, yellow, blue, gray, or green, all

(*Continued on page 8, column 1*)

NATURE PHOTO EXHIBIT AT MUSEUM FEB. 1—28

AN EVENT to which thousands of persons look forward each year is the Annual Chicago International Exhibition of Nature Photography. This year's show, ninth in the series, will be held as usual at Chicago Natural History Museum from February 1 to 28. The work of photographers of nature has, of course, a direct correlation with the objectives of the Museum and, because of this shared interest in recording and illustrating the things that make up this world and its various forms of life, the contest and the resulting exhibit have become a joint annual undertaking of the Museum and the Chicago Nature Camera Club.

'SKUNK CABBAGE'

Entered in Plant-Life Division of Nature Photography Exhibit by Grant M. Haist of Rochester, N. Y.

The show is the largest anywhere in the world that is devoted exclusively to nature photographs, and it ranks among the largest photographic exhibits even without respect to the limits of its field. It includes photographs by both amateurs and professionals in the United States, Canada, Latin America, Europe, the Orient, Africa, Australia, and New Zealand, and entries for the contest are received for months preceding the show.

THOUSANDS OF ENTRIES

Approximately 3,600 pictures were submitted, a number exceeding any past year. From these about 200 prints and 800 color-transparencies have been selected for exhibition. Those to be displayed are the choices of a panel of judges: Roland Eisenbeis, Senior Park Naturalist of Cook County Forest Preserve District, Rachel M. Osgood and Jack Remde, well-known photographers, and two members of the Museum staff—Robert F. Inger, Curator of Amphibians

and Reptiles, and Rupert L. Wenzel, Curator of Insects.

The prints and the miniature color-slides are grouped in separate divisions because different exhibition techniques must be used for each. The prints will be on public view daily in Stanley Field Hall during the period of the show. The color transparencies will be shown only on the afternoons of two Sundays, February 14 and 21, at 3 o'clock, when they will be projected in mural size on the screen in the James Simpson Theatre. Music will accompany the showings. Admission to the Theatre is free, and the general public, as well as members of camera clubs, and others interested in photography, are invited to attend.

There are three classifications for both prints and transparencies: animal life, plant life, and general (which includes geological formations, scenery, clouds, etc.). Silver medals and ribbons denoting honorable mention have been awarded by the Chicago Nature Camera Club to the photographers whose work has been judged the best in each classification. In addition there are two special medals awarded by the Nature Division of the Photographic Society of America. Winners of medals receive permanent recognition also by having their names inscribed on a bronze plaque at the Museum. This plaque is a contribution of Mrs. Myrtle Walgreen, a member of the Chicago Nature Camera Club and in her own right an enthusiastic photographer.

'BETATAKIN' (NORTHEAST ARIZONA)

Photograph of a Pueblo Indian archaeological site entered for the Nature Photography Exhibit by H. R. Haines of Visalia, California. Because this Bulletin went to press before the judges made their decisions, publication of any of the photographs in this issue does not necessarily signify acceptance of the pictures for the exhibit.

Lectures, Movies Begin March 7 . . .

SATURDAY PROGRAMS SET FOR ADULTS, CHILDREN

Captain Jacques-Yves Cousteau, famed underseas explorer-photographer and author of the best-selling book, *The Silent World*, opens the spring season of the Edward E. Ayer Lecture Foundation's Saturday afternoon lectures with the first midwest presentation of his color motion-picture, "Menfish of the Deep" on March 6 at 2:30 P.M. Captain Cousteau is co-inventor of the Aqualung that revolutionized undersea exploration by enabling its wearer to swim freely without any lines to the surface. With the aid of the most advanced undersea motion-picture camera, Captain Cousteau brings to his audience the wonder of the "silent world" where he and his "menfish" companions live like fish 300 feet under the sea. His movie is a record of man's newest progress in probing the "incredible realms of nature."

No tickets are necessary for admission to this and the eight subsequent illustrated lectures on Saturdays in March and April. A section of the James Simpson Theatre where the programs are presented is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing. Seats will be held in the Member's name until 2:25 o'clock on the lecture day.

The children's series given by the Raymond Foundation features in its opening program, "Life in a Pond," a movie on plants and animals that inhabit water. The movies begin on March 6 and continue on each of the nine Saturdays at 10:30 A.M. through March and April.

DALLWIG TO PROBE ORIGINS OF LIFE

"Life—What Is It?" is the subject of the dramatized narrative to be presented at the Museum each Sunday afternoon in February by Paul G. Dallwig, Layman Lecturer. Mr. Dallwig will attempt to answer this basic question with data regarded as most acceptable by scientists whose lives have been dedicated to research on this and allied subjects. Part of his lecture will be devoted to the reproductive processes in plants and animals, illustrated by the Museum exhibit showing the stages in the birth and pre-natal development of a human child. The same lecture will be given at 2 P.M. on each Sunday of the month —February 7, 14, 21, and 28.

Museum Members are admitted to these lectures upon presentation of their membership cards; others must make reservations in advance by mail or telephone (WAbash 2-9410). There is a half-hour intermission for refreshments in the Museum cafeteria at 3. The programs begin in the Lecture Hall and progress into exhibition halls containing material that Mr. Dallwig uses to illustrate his dramatizations.

The Dallwig lectures, increasingly popular with Chicagoans for thirteen past years, opened in January with an attendance breaking all previous records. The subject was "A Trip to the Moon—Why Not?" Many of those present made reservations on the spot for future lectures on other subjects. On Sundays in March Mr. Dallwig's topic will be "Behind the Scenes in Our Museums."

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Adm. Royal E. Ingersoll, Washington, D.C.—weapons from China, Japan, and Africa; Louis W. Jacobs, Merrimac, Wis.—7 pieces of blue-and-white ceramic "export ware," Philippine Islands; Benjamin Samuels, Chicago—gold-embroidered gown, China; Robert Trier, Chicago—15 archaeological and 2 ethnological specimens, Chicago

Department of Botany:

From: Dr. H. C. Bold, Nashville, Tenn.—32 algae, Tennessee; Dr. V. J. Chapman, Auckland, New Zealand—4 algae, New Zealand; William A. Daily, Indianapolis, Ind.—59 algae, Indiana; Dr. E. Y. Dawson, Los Angeles, Calif.—23 algae, French Indo-China; Dr. V. M. Diller, Cincinnati, Ohio—44 algae, Ohio; Dr. Maxwell S. Doty, Honolulu, Hawaii—75 algae, Pacific Islands; Dr. W. T. Edmondson, Seattle, Wash.—9 algae, Washington; Dr. L. H. Flint, Baton Rouge, La.—11 algae, Louisiana; Dr. H. Silva Forest, Williamsburg, Va.—493 algae, Tennessee, Virginia, South Carolina, and Louisiana

Department of Geology:

From: Dan Kreutzer, Chicago—specimen of *Flexicalymene meeki*, Ordovician of Ohio; George Langford, Jr., Hinsdale, Ill.—fossil insect, Illinois Pennsylvanian

Department of Zoology:

From: Pfc. Charles P. Deem, San Francisco—2 species of fresh-water fishes, Korea; Henry S. Dybas, Homewood, Ill.—104 insects, Illinois; Dr. Henry Field, Coconut Grove, Fla.—collection of Florida tree snails, southern Florida; F. E. Holley, Lombard, Ill.—19 insects, New York and Illinois; Dr. Edwin V. Komarek, Thomasville, Ga.—14 bats, Georgia; Dr. Donald C. Lowrie, Moscow, Ida.—130 insects and allies, United States and Mexico; Dr. Jeanne S. Schwengel, Scarsdale, N.Y.—collection of inland shells, worldwide; Universitetets Zoologiske Museum, Copenhagen, Denmark—2 mammals; Dr. Petr Wygodzinsky, Tucumán, Argentina—320 beetles, Argentina; Chicago Zoological Society, Chicago—5 birds, captive; William L. Culbertson, Madison, Wis.—2 Pleistocene fresh-water shells, Manitowoc County, Wisconsin; Dr. Ernest P. Du Bois, Urbana, Ill.—2 mammal skulls reptile skeleton, amphibian skull, fish skull

PROGRAM OF EXPEDITIONS FOR 1954 ANNOUNCED

Although its program of expeditions and field work for 1954 will be somewhat restricted by stringency of available funds and most operations will be on a small scale, Chicago Natural History Museum will have members of its scientific staff and other collectors at work in far-flung areas. Among places where collecting and research will be carried on are Angola (Portuguese West Africa), Nepal in India, the Philippines, El Salvador, Peru, Mexico, and Europe as well as many parts of the United States.

The Department of Anthropology will concentrate all of its efforts upon one expedition, but in number of personnel involved, equipment required, and physical immensity of the tasks to be performed, it will be the largest-scale operation of the year. This will be the 20th Archaeological Expedition to the Southwest (eleventh season in New Mexico—in the earlier years excavations were made in southwestern Colorado). Dr. Paul S. Martin, Chief Curator of Anthropology, will, as in past seasons, direct the work. His principal associate will again be Dr. John B. Rinaldo, Assistant Curator of Archaeology. From the remains of villages of prehistoric Indians who have been given the name of Mogollones by the archaeologists, Chief Curator Martin and his diggers each year bring to light additional ancient objects that enable them to re-create the culture and history of the extinct tribe. Some of the sites excavated have been buried as long as 4,000 years. In the 1954 season, Martin expects to approach the end of work in New Mexico and plans in succeeding years to follow traces of the movements of these people into areas of Arizona and elsewhere.

COLLECTING IN AFRICA

Several zoological expeditions are under way or to be initiated in 1954. In January, Gerd Heinrich, a well-known zoological collector of Dryden, Maine, was on his way to Angola (Portuguese West Africa), accompanied by Mrs. Heinrich. They constitute the personnel of the Conover Expedition, financed with funds provided by the late Boardman Conover, a Trustee of the Museum, who died in 1950. The Zoological Expedition to Peru (1953–54) will continue its general collecting of birds, mammals, reptiles, and amphibians in the Peruvian highlands and valleys. This year Assistant Taxidermist Celestino Kalinowski hopes to reach several areas of special interest on the Pacific slopes of the Andes. Collecting directed primarily to birds will be continued in Nepal by Dr. Robert L. Fleming. He is superintendent of the Medical Mission to Nepal, and is assisted by his wife, Dr. Bethel Fleming.

Field Associate D. S. Rabor will continue his general zoological collecting in the Philippine Islands. Dr. Austin L. Rand, Curator of Birds, after his attendance at the Eighth Pacific Science Congress in Manila late in 1953, has been associated with Dr. Rabor in field studies on Philippine birds. Next summer Dr. Rand will attend the Eleventh International Ornithological Congress in Basel, Switzerland.

TO MEXICO FOR FISHES

Loren P. Woods, Curator of Fishes, will lead an expedition to southwestern Mexico to collect marine fishes in tidepools of the Acapulco area. He will join at Salina Cruz with shrimp fishermen who always have a byproduct of more than usually interesting fishes from their shrimp-trawling operations. His collecting has the special purpose of adding information for revision of *The Marine Fishes of Panama*, one of the Museum's most important publications in this field.

Rupert L. Wenzel, Curator of Insects, will visit the Pacific states to study the beetles of the family Histeridae at the California Academy of Sciences and other entomological centers. He will supplement his museum work with field collecting for special groups of beetles and especially for the interesting array of forms that inhabit rodent burrows. Associate Curator of Insects Henry S. Dybas, who will continue his survey of the southeastern United States for the minute leaf-litter insects, will make trips to Georgia and to some of the Gulf states. Dr. Fritz Haas, Curator of Lower Invertebrates, is conducting the Palestine Zoological Expedition to collect mollusks in the western Mediterranean region (Israel and Cyprus).

Local field work will continue, particularly a survey of the fishes of the Chicago region. Miss Margaret G. Bradbury, Artist in the Department of Zoology, aids in this study. It has proved possible to join the last of commercial fishermen of the south end of Lake Michigan and to gain valuable data and collections by working with them. Miss Laura Brodie, Assistant, Department of Zoology, will continue study of the fall blue-racer aggregation in the Indiana Dunes. Miss Brodie joins actively with Miss Lillian Ross, Associate in the Division of Insects, in studies on the local spider fauna.

EL SALVADOR PROJECT

Dr. Sharat K. Roy, Chief Curator of Geology, will spend several months in El Salvador in continuation of volcanological research he began there on a previous expedition in 1951. Collecting fossil mammals in Texas will be continued by Bryan Patterson, Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils. Fossil collecting in England and Scotland will be undertaken by Dr. Robert H. Denison, Curator of Fossil Fishes, who began European investigations last year on a fellowship from the John Simon Guggenheim Foundation. Dr. Rainer Zangerl, Curator of Fossil Reptiles, and William D. Turnbull, Fossil Preparator, will seek fossil fishes and reptiles in a Pennsylvanian deposit of Indiana. Fossil-plant collecting in various parts of Illinois will be continued by George Langford, Curator of Fossil Plants. Robert K. Wyant, Curator of Economic Geology, will gather needed specimens of ores in the Lake Superior iron areas.

The Department of Botany has no expeditions scheduled for 1954, but in the summer Dr. Theodor Just, Chief Curator, will go to Paris as a delegate to the Eighth International Botanical Congress.

MUSEUM RECEIVES GRANT FOR RESEARCH ON BATS

The Museum has received from the National Science Foundation (Division of Biological and Medical Science) a grant of $10,000 toward the cost of a five-year research project to assemble material required for publication of a catalogue of the Microchiroptera (small bats). Colin C. Sanborn, Curator of Mammals, who has specialized in bat studies for many years, will be in charge of the undertaking. Part of his work on the current project will be conducted in London and in South Africa. The results will be published by Chicago Natural History Museum Press.

MUSEUM VISITORS IN 1953 TOTALED 1,204,855

The what, why, where, when, and how of the world we live in—its formation and the plants, animals, and peoples that inhabit it—were drawing-cards for 1,204,855 people who in 1953 visited Chicago Natural History Museum to get the answers from exhibits. Only 132,198 paid the nominal admission fee charged on certain days, while 1,072,657 or close to 90 per cent came on the free days—Thursdays, Saturdays, and Sundays. Although there was some decline from the attendance of the previous year, the attendance in 1953 remained well above the average level that has prevailed since it first exceeded a million in the middle 1920's.

INFLUENCE EXTENDED

In addition to those who actually visit the Museum, hundreds of thousands of others each year receive its educational benefits. Traveling exhibits reach hundreds of thousands of pupils in the Chicago schools every two weeks during the school terms and, likewise, thousands of others are reached by the extension lecturers sent out by the Raymond Foundation of the Museum. The press, radio, television, and other media carry information from the Museum to countless others.

BALINSASAYO—

(*Continued from page 5*)

in pastel shades and some patterned and variegated. I suppose with the sudden downdrafts that occur on these steep slopes the moths are carried from ordinary flight into the water where some predator (an insect?) eats the bodies, nipping off the wings.

To get anywhere over land in this area, one traverses steep slopes. Perspective sometimes goes curiously awry when descending, with the treetops ahead always just below your feet and then the lake, simulating the sky, appearing farther below. It's as if the land had been tilted, and correlates with the strange feeling I have had that the island of Siquijor was hanging in the sky, far above the horizon. It takes time for a plains-dweller to get used to mountain views.

FEW LEECHES BITE

In Talinas (Horns of Negros) the green-backed leeches crawled on one, but didn't bite (or suck blood). Here there's also another kind that does. Often, on grass or on the leaves, one can see them stretched out at their fullest extent waiting for something to seize. But the surprising thing, in view of their abundance, is how few actually do bite me. I've only had two or three bites in a week and have seen hundreds of leeches (of course if I'd been barefooted it would have been a different story!). Mosquitos aren't bad either—sometimes a few in the forest; but our house, day and night, seems clear of these.

The people here near the mountain top are on the frontier, carving into the original forest and carrying on such old-time practices as rubbing two sticks together to get fire. Yet they're only a half-day's walk from electric refrigerators and a public bus line. What food crops I've seen (sweet potato, taro, corn) grow poorly. The people are concentrating on abaca, the fiber of which they strip, carry to the coast, and sell. Presumably the popular slogan "Land for the landless" in not too many years will mean deforestation by cutting and burning of these trees—a few years of cultivation, and then the abandonment of these steep rocky slopes as hopeless for further agriculture, as has happened with the cogon grass slopes lower down that went through the same cycle earlier. Several men come up here for abaca culture, but only one family, that of the station caretaker, lives here, in a thatched hut overlooking the lake. In addition to other things, he runs a line of pig traps, the "balatics," of which I've been warned. I've seen several. They're fiendishly simple: just a bamboo-headed spear lashed to a bent sapling that is the spring. In addition there's a trigger arrangement and the trip string, which you pull to set it off.

Some birds are extremely elusive, like the tailorbird, a gray rufous-crowned warbler whose "sewn" nest gives it its name. The song of "teg-wa-tee" that the boys say is its song comes from everywhere: forest undergrowth and clearing. When you get close, you hear a few warning chirps and it is gone, a vaguely seen shape and a few shaking leaves, skulking away into the shrubbery. I've learned little of it, but at least I've seen it.

When I leave a forest camp I wonder how many birds I've been unable to find, birds that were there but escaped me. Many, probably. But here there are two such species that call continually from the forest edge, as if to taunt us with the fact that we were unable to find them. One is a typical coucal call, "bub-bub-bu-bu-bu," and probably belongs to a forest coucal that at my approach creeps away through the shrubbery. The other is certainly the call of a brush cuckoo, for its song "piet-van-fleet" is one I know well from Malaysia. Instead of sneaking away, this bird sits up in some forest tree and by its immobility escapes detection.

Our horizon here is limited—not more than two miles across, I'd say, just the rim of our little crater valley. It means our weather can change quickly. Sometimes clouds wreathe our peaks; sometimes they come from below, as one afternoon—the sun was shining when suddenly the wind drove up storm clouds from below. We didn't see them until they came over the lip of our little valley, with rain and thunder, and then the storm was gone as quickly. The forest was always sopping wet from clouds and rain, uncomfortable to live in when you can't get your clothes dry, but it's a forest filled with a host of interesting things and remarkable because it still exists as a forest in this heavily populated, mostly deforested part of the Philippines.

NEW MEMBERS

The following persons became Museum Members from December 16 to January 15:

Corporate Member

John T. Pirie, Jr.

Non-Resident Life Member

Hiram B. D. Blauvelt

Associate Members

Wesley M. Dixon, Jr., Mrs. Frank J. Dowd, Robert M. Eichler, Daniel Perlman, Robert B. Schnering, Daniel C. Searle, William L. Searle

Annual Members

George J. Biddle, Willmar A. Chulock, R. W. Ferguson, C. O. Futterer, G. L. Grawols, Ellsworth A. Handy, Bennet B. Harvey, Miss Jane Laird, Pierre F. Lavedan, Donald F. Lindberg, Mrs. Herbert I. Markham, William A. Marsteller, John G. Maynard, Walter J. Nickel, Lester N. Selig, A. J. Uttich, S. C. Waldman, Richard H. West, P. L. Yates

EXPEDITION TO STUDY NEAR-EAST ANIMALS

Certain aspects of Near-East animal life will be studied and specimens collected on an expedition for which Dr. Fritz Haas, Curator of Lower Invertebrates, will fly to Israel on February 1. Dr. Haas will spend several months in the field, primarily in observation of the adaptation of invertebrate animals to life under desert conditions. In addition to invertebrates, studies will be made of reptiles, fishes, and other animals. Dr. Haas is especially interested in the fresh-water life of isolated rivers in Israel, which will be his principal collecting field, but he may also make zoological explorations on the island of Cyprus. Before returning to Chicago, Dr. Haas will survey collections in important museums of Switzerland and Germany.

STAFF NOTES

D. Dwight Davis, Curator of Vertebrate Anatomy, left the Museum on January 15 for a six-month leave of absence to fulfill a term as a visiting professor at California Institute of Technology in Pasadena, where he will conduct a lecture course on comparative anatomy and its relationship to paleontology . . . **Dr. Julian Steyermark,** Curator of the Phanerogamic Herbarium, recently lectured before the Kennicott Club and the Barrington Natural History Society on his experiences in the "lost world" of Venezuela where he led a Museum expedition last year . . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, recently spent ten days on a special research project at Arizona State Museum in Tucson. He worked in the famous sherd library on material relating to the Mogollon culture that his expeditions have been investigating for years and visited a number of sites where the tools of early man, from 6,000 to 11,000 years ago, have been found . . . . **Miss Elaine Bluhm,** Assistant in Archaeology, recently studied sandals of various archaeological periods in the collections of Arizona State Museum.

Illinois Audubon Screen-Tour Features Hudson Bay

"Hudson Bay Adventures," a lecture by C. J. Albrecht, accompanied by color motion-pictures, will be presented in the James Simpson Theatre of the Museum on Sunday, February 28, at 2:30 P.M. under the auspices of the Illinois Audubon Society. The lecturer was formerly a member of the staff of the Department of Zoology at this Museum. Admission is free. Reserved seats are available to members of the Audubon Society or the Museum upon presentation of their membership cards before 2:25 P.M.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN

Vol. 25, No. 3 - March 1954

Chicago Natural History Museum

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Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

RARE PORTRAIT OF INDIAN PRESERVED IN MUSEUM

BY GEORGE I. QUIMBY
CURATOR OF EXHIBITS, ANTHROPOLOGY

IN 1894 Chicago Natural History Museum (then called Field Columbian Museum) acquired the portrait of an Indian chief painted by Chester Harding in 1820.

Harding, a self-trained artist, was born in Massachusetts in 1792 and died in 1866. He began to paint portraits in 1818. In 1820 Harding went to St. Louis with a letter of introduction to General William Clark, who was then Governor of Missouri and Superintendent of Indian Affairs for the western regions (General Clark is best known for his part in the Lewis and Clark explorations of the West). General Clark helped Harding obtain a studio and gave him his first portrait commission in St. Louis. Of this incident Harding wrote, "I was decidedly happy in my likeness of him, and, long before I had finished his head, I had others engaged; and for fifteen months I was kept constantly at work."

It must have been during these fifteen months that Harding would have had the best opportunity to paint portraits of Indians, because the rest of his life was spent mostly abroad or in the eastern United States. In fact only one Indian portrait was acknowledged by Harding in his autobiography where he mentioned "painting one of the Osage chiefs" while "a deputation from this tribe" was "on a visit to Governor Clarke." He added that "the old chief was a fine looking man of great dignity."

AMERICAN INDIAN CHIEF

Portrait of an Osage tribal leader, painted in 1820 by Chester Harding, well-known artist of the period.

The Museum's portrait is provisionally identified as that of an Osage Indian chief. The portrait by Harding was included in a collection of paintings purchased by the Museum in 1894 from Miss Emily O'Fallon of St. Louis, the grandniece of General William Clark.

STAFF NOTES

Paul C. Standley, Curator Emeritus of the Herbarium, has been appointed by Dr. Juan Manuel Gálvez, President of Honduras, as technical advisor *ad honorem* in the botany department of the republic's Ministry of Agriculture. The appointment was recommended by Don Benjamín Membreño, Minister of Agriculture. Mr. Standley, who now lives in Honduras, recently lectured on plants poisonous to stock in a special course in veterinary science at Tegucigalpa .... **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, is now pursuing his studies at Missouri Botanical Garden. While in St. Louis he plans to address the St. Louis Academy of Science on the subject "Botanical Expedition in the Lost World of Venezuela" ... **Dr. B. E. Dahlgren,** Curator Emeritus of Botany, has left for Cuba to continue his studies of Cuban palms ... **Donald Collier,** Curator of South American Archaeology and Ethnology, recently spent a week in New York in research on Peruvian pottery at the American Museum of Natural History and at Columbia University, and he also inspected the special exhibit of Andean art at the Museum of Modern Art .... **Dr. Karl P. Schmidt,** Chief Curator of Zoology, represented the Museum at the Work Experience Conference held at Antioch College, Yellow Springs, Ohio, February 12 and 13. The Museum is one of the co-operating employers in the work-study program of the college.

THIS MONTH'S COVER

Marco Polo's sheep, named for the famed Venetian traveler who discovered it in the 13th century, lives in the Pamirs of Russian Turkestan at elevations from 10,000 to 18,000 feet above sea level. Its horns are the longest of any wild sheep, measuring about 70 inches on the curve and 45 inches from tip to tip. The specimens in the Museum habitat group shown on our cover were shot by Kermit Roosevelt and Theodore Roosevelt, Jr., in October, 1925, on the James Simpson–Roosevelts Asiatic Expedition. Because the native haunts of these animals lie behind the Iron Curtain, the rest of the world can expect no further specimens until that barrier is lifted.

Contributor Elected

In recognition of notable gifts to the Library of the Museum, Langdon Pearse of Winnetka, Illinois, has been elected by the Board of Trustees as a Museum Contributor. Contributors, a special membership classification, are those whose gifts to the Museum range in value from $1,000 to $100,000. Mr. Pearse presented valuable collections of botanical and zoological books.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Museum Course for Girl Scouts

Several hundred Girl Scouts of Chicago and suburbs attended a nature course conducted at the Museum on Saturdays during February by the staff of the James Nelson and Anna Louise Raymond Foundation. The four classes that were planned to help the girls meet the requirements for the award of Girl Scout nature-proficiency badges covered mammals, wild plants and trees, birds, and rocks and minerals.

SATURDAY LECTURES AND COLOR FILMS TO BEGIN MARCH 6

TO THOSE PEOPLE who feel the pull of wanderlust when they catch the first breath of spring, the Museum offers a chance to travel to places far and near, foreign or familiar—vicariously, of course, through the reality recorded in the color-films and lectures of men who have made a life career of satisfying wanderlust.

These lecture-movie programs are provided by the Edward E. Ayer Lecture Foundation and will begin on Saturday afternoon, March 6, and continue on every Saturday thereafter through April 24. They will be given in the James Simpson Theatre of the Museum at 2:30 P.M. It is necessary to restrict admission to adults because of limited accommodations. For children, free motion-picture programs are given in the Theatre on the mornings of the same Saturdays under the auspices of the Raymond Foundation.

Following are dates, titles, and lecturers in this season's series for adults:

March 6—Menfish of the Deep

Captain Jacques-Yves Cousteau

The exotic and almost unbelievable world that exists below the sea has yielded some of its secrets to Jacques-Yves Cousteau and his companions who, with the aid of the Aqualung, are able to live under water like fish down to depths of 300 feet. As the "menfish" swim slowly and effortlessly through the "basement of the world" they come upon fascinating animal life never before seen. With this showing of his film Captain Cousteau will make the first Midwest appearance on his American tour to introduce to the sound-filled world above the sea the silent one below.

March 13—Atlantic Coast Wonderland

Julian Gromer

Julian Gromer's travelogue shows the Inland Waterway from New York City to Key West and 80 miles into the ocean to the Dry Tortugas. This film is reputedly the only one that gives complete coverage to this important and colorful part of the United States. Atlantic City's famous board walk, the United States Naval Academy at Annapolis, the crabbing industry at Chesapeake Bay, the colonial charm of Jamestown and Williamsburg, the wildlife of the Everglades, the shrimp fleet at Key West, porpoise fishing in Florida Bay—all are highlighted in Mr. Gromer's lecture and movie.

March 20—New Zealand Highlights

Dr. Alfred M. Bailey

New Zealand is a land no larger in area than Colorado, but its size is no indication of the variety in scenery and man-made wonders that it offers the visitor. Rugged wave-washed cliffs and beautiful sand beaches, backwood villages and modern cities, the place made famous as Cape Kidnappers by Captain James Cook who named it after trouble with the Maoris—Dr. Bailey, Director of the Denver Museum of Natural History, has photographed all of these with an understanding of the distinct character of this country and a sense of the drama inherent in the life of all peoples.

March 27—Jungle Career

Oliver Milton, Game Ranger

When the famous hunting areas of Africa had reached a point where the big game had become almost extinct, game rangers were appointed to see to it that the animals had a chance to live and flourish. Oliver Milton is one of these game rangers—his bailiwick is a huge 18,000-mile area in Africa's last great frontier region—the territory of Tanganyika. His work provides rich opportunities for seeing Africa's remaining big game in an undisturbed state. Those who were introduced to this part of the world's untrammeled jungles in the movies "King Solomon's Mines" and "The Snows of Kilimanjaro" will appreciate the opportunity to see more of this country filmed by a man who has made the jungles his home.

RESERVED SEATS FOR MEMBERS

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

April 3—Italian Interlude

Dr. J. Gerald Hooper

Dr. and Mrs. Hooper, who call themselves "vagabonds with cameras" have traveled to many places to record in pictures the distinct character of the countries and people they visit. Their film on Italy opens in the cosmopolitan city of Rome where the citizens live in and around the stone relics of a civilization that was old when Christ was born. North of Rome is the city of Florence, now the art center of the world, where the Hoopers have photographed the modern Italian artists at work. Then on to Venice, Milan, Sienna—all familiar places, at least in name. The film-lecture ends with a century-old festival and procession.

April 10—Once Upon an Island

Robert C. Hermes

In the hit musical "South Pacific" there is a song that tells the yearning of most people "for another island"—one "where they know they would like to be." Robert Hermes describes his motion-picture program as the story of his adventures in living on that "other island" that everyone would like to visit. He found that islands have a very special charm also for birds and animals who seek sanctuary there just as mankind does. His travel-talk is about his experience in living in the miniature worlds surrounded by water.

April 17—Turkey

Karl Robinson

Mr. Robinson's colorful films are a photographic record of the Moslem world's most progressive republic. Straddling the Dardanelles, Turkey lies in both Europe and Asia and its culture is a composite of both European and Asiatic influences. Common borders with Communistic Bulgaria in the west and Soviet Russia in the east make Turkey's geographic position one of great importance to the Atlantic Pact nations. Mr. Robinson's film both records and interprets this changing and warmly colorful country.

April 24—Wildlife of Wisconsin

Cleveland P. Grant

You may think you are familiar with the birds and flowers you see from day to day, but it takes the perceptive eye and extensive knowledge of a naturalist like Cleveland P. Grant to produce films that make you really aware of the natural wonders around you. Mr. Grant's movie, which has many sequences of song and game birds and of plant and animal life, shows the most beautiful of midwest scenery as well. This film will be a happy reminder of the many things there are to see in our own corner of the world.

Curator Roy to Study Volcanoes

Dr. Sharat K. Roy, Chief Curator of Geology, expects to leave for El Salvador about the middle of March. He will continue the work on volcanoes that he started in 1951, with especial stress on Izalco, an active volcano that has been erupting ever since it was born in 1770. Izalco, now over 4,000 feet high, has discharged more lava than any other volcano of its kind and age. It ranks among the most active volcanoes of the world and it offers an excellent opportunity to study volcanism first-hand.

An exhibit illustrating mineral fluorescence can be seen in Hall 35.

THE SMELT, AN OCEAN FISH THAT LIVES IN THE GREAT LAKES

By LOREN P. WOODS
CURATOR OF FISHES

THE STORY of the smelt, its introduction and phenomenal spread through the Great Lakes, and its decline and recent recovery has been told many times but always in parts and fragments. Therefore, unless a scrapbook has been kept, it is difficult to fit the various facets of this remarkable story together into a continuous whole.

The introduction of the smelt into Great Lakes waters has been alternately condemned and praised—condemned entirely without evidence as a menace to lake trout and whitefish; condemned with some cause when commercial fishermen, while fishing for other species, find smelt tangled by their teeth in the gill-nets in such numbers that in some places this kind of fishing has to cease at depths known to be inhabited by smelt during the summer months. The lake-trout fishermen on Lake Superior have recently been blaming poor fishing on the smelt. They claim that the trout leave the banks where they formerly fed and where a successful gill-net fishery was operated and that they now are found only on the grounds where there are smelt. This explanation is based on the observation that those trout that are caught are always crammed with smelt.

CHICAGO LAKE FRONT SCENE

Booms with ring nets in close array along seawall at 49th Street. The nets are lowered into the water for the taking of smelt as the fish move along the shore during their spawning run. The fish are removed with small dip nets.

On the other hand, during the late 1930's and for the past four or five years the catch of smelt has been quite large, in some places the most abundant fish caught, thus adding to the income and sport of many individuals. Smelt, rather than being predators upon the more valuable species, are instead preyed upon by lake trout and walleyes and are a principal source of food for these fishes. Recently the smelt have been reported by fishermen to be feeding extensively upon small sea lampreys and if this habit is widespread the smelt may play a part in helping to keep this pest under control.

The smelt in the Great Lakes except Lake Ontario are all believed to be descended from a successful planting, in 1912, of 16,400,000 eggs in Crystal Lake, Benzi County, Michigan. However, it was not until 1918 that the first fish were noticed, and the first large spawning run occurred in 1922. In 1923 they were first collected in Lake Michigan, having escaped from Crystal Lake by an outlet. A year later they had crossed Lake Michigan to Big Bay de Noc at the north end of Green Bay. In 1925 they were in Lake Huron and by 1930 had reached Lake Erie. They seem not to have invaded Lake Superior until 1933 or 1934. Their spread down the west shore of Lake Michigan and to the southern parts of the eastern shore was delayed until 1930–31 but by 1936 all suitable waters of Lake Michigan were occupied. From 1936 through 1941 large runs occurred every spring. It was noticed while keeping records on the dispersal that generally about five years after the smelt were first reported in an area the first spawning occurred there. The annual yield of smelt in the Great Lakes is not known, but the production in Lake Michigan alone in 1942 has been estimated to have reached nearly 14,000,000 pounds. This was about two-thirds of the entire catch reported for Lake Michigan that year and about one-seventh of the reported total catch for all species in all the Great Lakes.

DECLINE OF THE TRIBE

Although the smelt became the dominant commercial species in Lake Michigan the other fisheries did not appear to suffer but flourished instead. Then in early October, 1942, dead smelt were noticed in Lake Huron off Saginaw Bay. By the end of the month the smelt were dying at Mackinac and by mid-November the "kill" had reached Grand Traverse. Smelt fishing in January and February, 1943, flourished in Green Bay but by mid-March the fishery had collapsed completely. By the spring spawning season in 1943 only a few survivors were left. Whatever was killing the smelt was progressive over a period of four and one-half months, and only smelt, of all ages and in all waters freely connected with Lakes Michigan and Huron, were affected. Smelt in Lake Superior and Lake Erie were not killed. The total loss of smelt in the period between 1943 and 1946 was estimated to be 50,000,000 pounds. Dr. John Van Oosten of the Fish and Wildlife Service, after a careful survey of the situation, concluded that a virus or bacterial disease was responsible for the mortality. Smelt "kills" have been recorded in many New England lakes where smelt were indigenous or introduced, as in Lake Champlain during the summer of 1882 when for about a week the lake was covered with dead floating smelt and the fishery suddenly declined, indicating that the stock had been greatly reduced. Occasionally during the spawning season a storm hits the exhausted fish tossing them onto the shore and causing great local mortality. But aside from Van Oosten's supposition that the widespread deaths may have been caused by an infectious disease the only explanation previously offered was "death due to obscure causes, as among higher animals."

RECOVERY IN RECENT YEARS

In 1945 Green Bay had a small run, and several light runs were reported elsewhere in Lakes Michigan and Huron. There was further improvement in subsequent years, and in 1949 the population was nearly recovered with Michigan alone producing over a million pounds. In 1951 there was an extremely heavy run and it is believed that now their numbers equal the pre-mortality years.

The smelt is so well known as to require little description other than that it is a small (7 to 14 inches) transparent olive-green fish of slender form with a long pointed head, large eyes, and deeply forked tail. This description is a little too general and to it must be added that between the soft-rayed fin of the back and the tail there is a small fin without rays (adipose fin) such as whitefish, trout, and salmon possess. These fishes are near relatives of the smelt and, except for a few minor anatomical peculiarities, smelt and salmon would be in the same family.

Smelt are best known as marine fish, the species (*Osmerus mordax* Mitchill) ranging in the western North Atlantic from Labrador to New York. In the sea as in fresh water, smelt gather inshore in winter and with the onset of warmer water in the spring run a short distance up streams to spawn. They have naturally become landlocked in fresh water, as in Lake Champlain and other New England lakes where they are considered to be indigenous, and they have been widely introduced into lakes large enough and deep enough to offer a cool retreat into deep water in summer. The smelt eggs introduced into Crystal Lake were from a landlocked population from a hatchery at Green Lake, Maine. In Lake Champlain there appear to be two races, a normal-sized and a dwarf race. The dwarf race appears

to be chiefly important as food for the "large" race.

HABITAT OF THE SMELT

In the ocean, smelt are never found more than a mile or two off shore or in more than a few fathoms depth. In the fall they move to the harbor mouths and are present in inshore waters all winter, even entering brackish water. They enter fresh water and begin the upstream migration when sufficiently high temperature has been reached. The spawning run begins at 40 to 42 degrees Fahrenheit and reaches its height at 50 to 57 degrees.

In fresh water after spawning, smelt do not immediately seek the deeper waters of the lake but gradually as the summer progresses go into deeper and deeper water. They appear to avoid water with a temperature higher than 59 degrees. This simple explanation for their retreat into deeper water is complicated by the fact that smelt avoid bright light. In the spring the waters are generally murky when they make their spawning runs, and as the waters become more transparent in summer so that the light penetrates more freely the smelt may be influenced to move into deeper water. This latter supposition is supported by their occasional appearance at the surface in summer late in the evening when the direct rays of the sun are no longer on the water. Generally during the summer the smelt in Lake Michigan live at depths of fifteen to nineteen fathoms where they are active enough to get tangled in gill-nets and where they may also be taken on hook and line.

PREDACEOUS AND CANNIBALISTIC

Smelt are predaceous fish living on crustaceans, insect larvae, and fishes—cannibalistic, they prey on other smelt. During the spawning season apparently most smelt do not feed at all since nearly all stomachs examined at that time have been found to be empty. Young smelt, one to three inches, as would be expected, eat plankton, chiefly crustaceans such as waterfleas and copepods, but they occasionally also eat one of their own species and fill out their diet with rotifers, algae, insect larvae, and pupae. Studies made of more than 3,000 smelt from Green Bay collected throughout the year showed that only 6.5 per cent had fed on fish, mostly other smelt but also the lake sculpins (*Cottus*) and burbot (*Lota*). All the rest were subsisting on invertebrates, especially on prawns (*Mysis*), scuds (Amphipoda), mollusca, and worms. No lake trout were found in any stomachs apparently for the reason that lake trout small enough to be preyed upon by smelt live in water so shallow that the smelt do not find them. Rarely whitefish and lake chubs are eaten but none were recorded in the above-mentioned study.

Separate studies made in Green Bay, at Manitoulin Island, and in Lake Champlain have generally agreed in indicating a largely invertebrate diet, but in Crystal Lake a study made of 147 smelt showed a predominant minnow diet, 97 per cent lake shiner, with only a few invertebrates eaten. This sample was taken September 1, a season when both smelt and lake shiners begin to gather in shoal waters and this factor combined with the small number of stomachs examined probably does not give a representative picture of their diet.

THEY SPAWN IN STREAMS

In the sea, smelt move inshore in the fall and in the spring they enter streams, going just above tidewater to deposit their eggs. Apparently they never go far, not more than a few hundred yards, but the eggs must be laid in fresh water. Flooding with salt water kills them. The eggs are extruded in clusters and sink, adhering to pebbles, weeds, sticks, and to each other. The incubation period is about 13 days and the young are believed to go immediately to salt water.

In the Great Lakes the run usually occurs when the ice is going out in the spring. As in the ocean the smelt go just inside the mouths of creeks. The ascent into the creeks is nocturnal; none return until daylight and a few remain in the creeks during the day. On entering the creeks they swim close to the bottom and avoid lights flashed into the water. The run generally lasts two or three weeks and is made up of fresh arrivals each night. After spawning, the fish, heads still pointing upstream, drift tail first down into the mouth of the stream. The males at spawning time can be distinguished from the females by their smaller size and by the arrangement of their pearl organs. These pearl organs are horny growths on the head and on the dorsal and pectoral fins of the male. The females develop pearl organs on the head but not on the fins.

Smelt spawn over a sand and gravel bottom, one female attended by several males. All have their heads pointed upstream. The female occupies a position slightly in advance of the males and slowly sways her body through an arc of five or six inches; the eggs are extruded and pass under the males before they reach the sand. The clusters adhere to whatever they touch. Some of the males collected at this time had eaten some eggs. Average-size females produce as many as 25,000 eggs, larger females up to 43,000 eggs.

It is during the spawning migration that the sportsmen take most of their smelt by dipping. Frequently the interference is so great that the fish cannot spawn and many are injured at this time by nets, by being stepped on, or even washed onto the banks by splashing. But in spite of such hazards this prolific fish by its very numbers overcomes man's interference and enough are produced to maintain and even increase their numbers in the face of great adversity.

GROWTH AND LONGEVITY

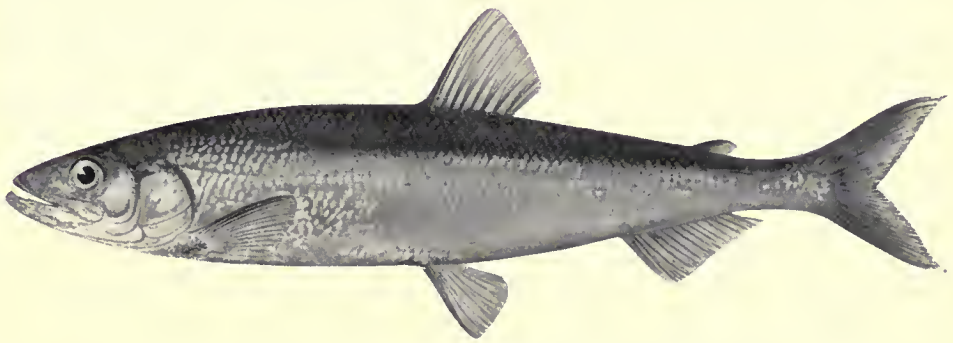
"Landlocked" smelts in Crystal Lake have grown to a length of 4½ inches by the end of their first year. By the end of their second year, when they participate in their first spawning run, they are 7 inches in length. In the ocean and in the Great Lakes they grow a little more rapidly. By the third year they average 10 inches and most individuals are a foot long by the end of their fourth year. The maximum size recorded was a five-year-old female, 14 inches total length. The oldest individuals on record were six years of age.

GENERAL ECOLOGY

As smelt are predatory and fish eaters, so are they in turn eaten by other kinds of fishes. They are, in Lake Michigan, eaten both as young and adults by lake trout, perch, walleyes, and burbot. In Lake Champlain smelt are part of the diet of these species and also of the landlocked salmon, pickerel, pike, eels, and rock bass. In Lake Michigan, trout formerly fed largely on lake chubs and sculpins, but with the increased abundance of smelt the trout's food habits shifted and the smelt became an important forage fish.

The sea lamprey has been held completely responsible for the decline of the lake trout in Lake Michigan and Lake Huron. The evidence on which this assumption is based

(*Continued on page 6, column 3*)



THE SMELT: BOTH EULOGIZED AND DENOUNCED

PRIZE WINNERS IN NATURE PHOTO SHOW LISTED

The photographs that won first-prize silver medals in each of the three sections of the Division of Prints in the Ninth Chicago International Exhibition of Nature Photography are reproduced on this page. The exhibit, which is divided into animal-life, plant-life, and general sections, is held annually in February under the joint auspices of the Chicago Nature Camera Club and the Museum.

'PETE, THE ORANG-UTAN'

By J. M. Miller, of La Grange, Illinois. Awarded silver-medal first prize in the Animal-Life Section of Nature Photography Exhibition.

This year's photo contest and exhibit exceeded those of all previous years in attracting the interest of photographers. Entries were received from 917 persons, many living in South America, Europe, Asia, Africa, Australia, and other far places. A total of 3,721 pictures was entered, of which 3,068 were color transparencies and 653 prints. From these the judges selected 845 slides and 248 prints for exhibition. The entries showed a 10-per-cent increase in slides and 20-per-cent increase in prints compared with the 1953 show, which had broken all previous records.

'SOFT SNOW BLANKET'

By Bosworth Lemere, of Santa Barbara, California. Awarded silver-medal first prize in General Section of Nature Photography Exhibition.

Following are lists of medal winners and awards of honorable mention for both prints and color slides:

MEDAL WINNERS

Prints:

ANIMAL-LIFE SECTION: J. M. Miller, La Grange, Ill.—*Pete, the Orang-utan*

PLANT-LIFE SECTION: Grant Haist, Rochester, N. Y.—*Fungi Family*

GENERAL SECTION: Bosworth Lemere, Santa Barbara, Calif.—*Soft Snow Blanket*

Color Slides:

ANIMAL-LIFE SECTION: Robert Potts, San Francisco—*Green Sea Anemone and Purple Sea Urchin*

PLANT-LIFE SECTION: Jack Roche, Caldwell, N.J.—*Fritillaria Imperialis*

GENERAL SECTION: John Benzel, Covina, Calif.—*Smoke Tree*

HONORABLE MENTIONS

Prints and Color Slides, All Sections

CHICAGO AREA

Pearl Schwartz Rice, Willard H. Farr, M. E. Kuntz, Helen Suter, William M. Angus, Jr., Louis W. Braun, Ted Farrington, Louise Broman, Howard Miller, Erik Sorensen, John Bajgert

OUTSIDE CHICAGO AREA

Raymond G. Feagans, Bremerton, Wash.; Mary Frey, Mankato, Minn.; Lou Gibson, Rochester, N. Y; Nan Justice, Raleigh, N. C.; J. L. Kenner, Boston; Smith MacMullin, Inglewood, Calif.; Eugenia Norgaard, Los Angeles; Floyd Norgaard, Los Angeles; Charles Norona, Los Angeles; A. W. Price, Ramsey, N. J.; R. L. Propst, Lebanon, Ore.; S. J. Rawley,

'FUNGI FAMILY'

By Grant Haist, of Rochester, New York. Awarded silver-medal first prize in Plant-Life Section of Nature Photography Exhibition.

Miami, Ariz.; Mabel Ross, Salt Lake City; Dora Sorenson, Minneapolis; Kathryn Stake, Salt Lake City; R. C. Taylor, North Hollywood, Calif.; Henry Tefft, Jr., Denver; Warren Z. Walter, Los Angeles; Roy Young, Los Angeles; William Amos, Middletown, Del.

Lewis Batts, Kalamazoo; E. H. Bourne, Penfield, N. Y.; Dr. M. A. Chandler, New Toronto, Canada; R. B. Chillas, Jr., Philadelphia; Reginald V. Corlett, Toronto; Harry and Ruth Crockett, Phoenix; Frank Fernandez, Rochester, N. Y.; T. Fuller, Louisville; Robert Hermann, San Diego; Robert C. Holman, Mifflinburg, Pa.; C. Molinelli, Martinsville, Ind.; Dr. R. Moose, San Bernardino, Calif.; Louis Quitt, Buffalo; Alice Stark, Toronto; S. Stern, New York

H. A. Thornhill, Merced, Calif.; Ralph J. Zaenglein, Maryville, Tenn.; Karl Obert, Santa Barbara; Gertrude Poole, Palo Alto; Arthur Underwood, Rochester, N. Y.; H. L. Gibson, Rochester, N. Y.; Richard D. Grill, Baltimore; Ben Hill-Tout, Vancouver; Kan Hing-fook, Hong Kong; Herman Krohn, Omaha; Charles Perkins, Washington, D. C.; L. B. Perry, Manchester, Conn.; George Sollman, Cobleskill, N. Y.; Henry C. Sollman, Cobleskill, N. Y.; Cheung Yu-chiu, Hong Kong; O. G. Edwards, Bangalore, India; Howard Oberlin, Canton, Ohio; Tan Seng-Huat, Penang, Malaya; Ralph W. Armstrong, Neptune, N. J.; I. C. Barker, San Francisco; Norma Belland, Cristobal, Canal Zone

Marjorie Clagett, Bowling Green, Ky.; Lily Colvin, Los Angeles; Ellen Cubitt, Toronto; Selina Cunliffe, Methuen, Mass.; Lad Cutak, St. Louis; Mrs. J. E. Goodwin, Toronto; Herbert Kaltman, New York; Ruth J. Nichol, Butte, Mont.; George Purdy, Port Orchard, Wash.; Donald T. Ries, Normal, Ill.; Conrad Roth, Portsmouth, Ohio; J. A. Russell, Sacramento

E. H. Thomas, Tacoma; Ruth Tollefson, Milwaukee; V. E. Ward, Angels Camp, Calif.; Elvin Warrick, Urbana; Charles Webber, San Leandro, Calif.; Paul J. Wolf, Bronxville, N. Y.; Violet Wooden, Fortuna, Calif.; Alfred Blyth, Edmonton, Canada; M. M. Deaderick, Carpinteria, Calif.; Caryl Firth, Trappe, Md.; Challis Gore, Orinda, Calif.; O. F. Metz, El Paso; A. J. Mueller, Appleton, Wis.; Howard Foote, New York; Dr. C. L. Lim, Penang, Malaya

SPECIAL MEDALS FOR COLOR SLIDES

Awarded by the Photographic Society of America

Raymond G. Feagans, Bremerton, Washington—*In Paradise Cove;* B. H. Perchuk, Chicago—*Red and Green*

THE SMELT

(*Continued from page 5*)

is the coinciding spread of lamprey and decline of trout plus the greatly increased number of scarred lake trout caught in these two lakes. It is possible that the decline of the smelt (1943) was one of the factors contributing to the decline of the lake trout that began in 1946, accelerated in 1947, and dwindled to almost nothing by 1948 and 1949. Since the smelt was an important item of diet of trout, it appears likely that the almost complete disappearance of smelt must have had an adverse effect on the trout. This effect was probably only temporary as the trout shifted back into their old habits of feeding on chubs. Not enough is known of this particular situation or of the interrelationships of Great Lakes fishes generally for anyone to be able more than to guess at a cause, or causes when some catastrophe hits a particular species.

The sea lamprey was first noticed in the Great Lakes about the same time that the smelt began to flourish here and possibly the smelt were of some importance in keeping the lampreys in check by eating their young. Unfortunately no studies were made on the food of smelt in Lake Erie where sea lampreys are rare or in lower Lake Huron, the only lake areas above Niagara that had been invaded by sea lampreys before the decline of the smelt.

The final word regarding the basic good or harm accomplished by the introduction of the smelt into Great Lakes waters has not been written. Not enough is known of the over-all productivity of the lakes or of the interrelations of species of fishes, invertebrates, and plants to determine the smelt's importance as a competitor for food, especially of young fishes, as a predator on other species, or the over-all effect of the introduction and expansion of an exotic on the native species.

Spring Visiting Hours Begin

Visiting hours from 9 A.M. to 5 P.M. will go into effect at the Museum from March 1 through April 30, an extension of one hour beyond the 4 o'clock closing time observed during the winter months.

BIRD-MAN FINDS PHILIPPINE LOWLANDS HOT AND NOISY, BUT FASCINATING

By AUSTIN L. RAND
CURATOR OF BIRDS

IT'S HOT at midday in the cogon grass country of the Philippine lowlands. And it's bright, too, with sunshine reflected from the pale coarse grass. Sweat runs into my eyes, and, when I stop to rest under a tree, the sweat doesn't dry off to cool me. This is the real tropics, where the sun glares down all day.

The cogon grass is a sad thing to see. The forest has been cleared and the soil cultivated for a few seasons. Then when the soil has been exhausted and left, this coarse grass and a few scattered trees grow over it. Periodically the grass is burned in the dry season. The grass country is almost birdless. Only occasionally is a grass warbler (*Cisticola*) seen.

Our camp (December 19 to 29) is on a point overlooking the junction of the Inuboanga and the Sicopon rivers. We had cleared away the lantana leaving the second-growth trees for shade. Now we have practically a barrio with twenty-two people. Besides Dr. D. S. Rabor* and his family and several relatives there are a group of Silliman University students (majors in biology), a cook, two preparators, and myself. Everyone shares in everything—the collecting, the preparing, the camp work. Sometimes the lanterns burn until 10 P.M. while six or seven people toil at preparing specimens. The knowledge of these people about the inhabitants of the forest is really surprising—not only of birds but of other vertebrates and of invertebrates and plants. Certainly when these students go out into teaching or into the business world of the Philippine Islands, the forest and its life will have a special meaning for them. They will be the people who will make natural science a living thing in the Philippines.

SOUND EFFECTS FROM A BAMBOO GROVE

There's a bamboo grove on the point opposite our camp that is a beautiful thing under the full moon. A bamboo grove in the evening when most other noises die is a noisy place. First the slightest breath of air sends the branches together to give hollow, tapping sounds, loud or faint. Then there are the branches that rub together to give scrapings and squeals and squeaks and groans, the leaves that rustle, and the dead leaves that come down with a whispering to land with a patting.

A medley of chuckles, squawks, gurgles, and plaintive "wooa's" come from the riverside bamboos each evening, just at dusk. At first I thought it might be a band of monkeys quarreling, or a couple of wildcats fighting. But Dr. Rabor knew it was a rail, the calls probably all coming from a single bird, though it certainly sounds like several. To these the giant gecko adds a chur, and then a loud "gek-ko." A nightjar adds a "choc-choc." The owls (*Ninox philippensis*), when they really get together, serenade us noisily. Sometimes it's a "kok," sometimes it's "hoo-KOK," sometimes "hoo-kok-KOK-KOK," or some variation of it, and then apparently two or more owls can call together giving a medley of calls, and some of the calls seem to change to growls. And always, of course, from camp one hears the college boys' guitar and their songs.

We came down here in a public bus. The surprising thing to me is that a Philippine bus is never full. We kept stopping along the road and picking up people when it seemed that surely there could be no room for more! The baggage compartment at the back was full of people (the baggage is on the roof and under the floor), and the children were all standing. Some fighting cocks were in cages on the roof, while others were in passengers' arms. A few people hung on the outside.

JOURNEY AFOOT BEGINS

At kilometer 95, at the Sicopon River, we dismounted, sent our luggage up river by canoe, and walked overland for two hours to our camp—first through paddy fields, with a stalk of sugar cane from a near-by patch to chew on, then cogon grass ridges with little streams and strips of forest between, to the junction of the Inuboanga and Sicopon rivers, where the forest patches, on gullies and coral-limestone ridges, begin to occupy as much area as does the cogon grass. Northward and inland the amount of forest increases, and low ranges of hills lead by steps to the distant east Negros range where I worked early in the month. Southward there's a glimpse of the blue Sulu Sea some ten kilometers away.

It's interesting to be in this dry, hot country and look inland to see rain clouds obscuring the farther hills. Sometimes the rain clouds are farther, sometimes nearer. Once they reached here, but with a faint spray that really wet nothing, and soon disappeared.

A visit to a near-by high plateau of farming country allowed Dr. Rabor to add two new birds to his Negros list: one is a blackish bush lark that I look forward to studying in the Museum because it may be a new form. The other is the skylark, a migrant from Eurasia. It may well be that Negros will come to be the best-explored island, zoologically, in the archipelago, thanks to the intensive work of Dr. Rabor. Formerly Luzon, in the vicinity of Manila, would have been so considered.

STRANGLER FIGS

One day, in the forest, I noticed especially the strangler figs. Remembering the philosopher Alfred Whitehead's view that violence and strife defeats itself and that peaceful co-operation, as exemplified by a forest, is the acme of development, I wondered how he would rationalize the activities of these figs. Strangler figs they're called and the name indicates just what they do. At first they're slender vines supported by a forest tree; gradually they branch and expand. The vine-like branches as they go up the tree trunk become laced together with a series of cross branches that look like the cross brace in a steel girder. Finally they coalesce and completely surround the trunk. The leafy branches of the fig take over the crown. The original tree that helped give the fig its start is dead and rots away, while the fig takes its place. This looks like exploitation rather than co-operation. The slowness of the strangling alone makes it undramatic.

Common sandpipers, migrants from Eurasia, are frequently encountered along our river, feeding singly along the tiny beaches most of the day. They make flights, apparently to and from a sleeping place. In the evenings the birds pass down-river; I've seen flocks of up to a dozen or so. As they go downstream, the birds that have spent much of the day near our camp spring up and join them. In the mornings the small flocks pass upstream, dropping off birds here and there as they pass. One flock, at the fork of the river, split up and part went each way. Though solitary in feeding, sandpipers seem to like company in sleeping.

The bat lorikeets I found fairly common here for the first time. They're tiny, for parrots, barely sparrow size, bright green, and decked with red. They get their name from their habit of sleeping hanging head down from their perch, like a bat, instead of sitting on the perch like most birds do. Up till now a glimpse of a passing bird was all I'd seen. But here I found a fruit tree

(*Continued on page 8, column 1*)

PHILIPPINE PICTURE-STORY SCHEDULED FOR APRIL

Two pages of sketches of life in the Philippine Islands will be published in the April issue of Chicago Natural History Museum "Bulletin." The drawings, by Miss Ruth Johnson of the staff of the Department of Zoology, were prepared from field sketches made by Dr. Austin L. Rand, Curator of Birds, during the study trip to the Philippines from which he recently returned.

* Dr. Rabor, Museum Field Associate, is head of the department of biology at Silliman University in the Philippines.

On Saturday Mornings . . .

FREE PROGRAMS OF MOVIES OFFERED FOR CHILDREN

It's free movie-time again for children on Saturday mornings at the Museum. Eight programs will be presented during March and April by the Raymond Foundation in the James Simpson Theatre. All begin at 10:30 A.M. Story-tellers—the men who made the films—will appear on three of the shows.

The titles of the films, with dates, follow:

March 6—Life in a Pond
Also a cartoon

March 13—Legends and Animal Folk-Stories
Also a cartoon

March 20—New Zealand Highlights
Dr. Alfred M. Bailey, narrator

March 27—Jungle Career
Game-Ranger Oliver Milton, narrator

April 3—So Dear to My Heart
(Disney film-story of a boy and his black lamb)

April 10—The Grass Forest
Robert C. Hermes, narrator

April 17—Jordan Valley (Biblical Lands)
Also a cartoon

April 24—Wheels Across Australia
Also a cartoon

PHILIPPINES—

(*Continued from page 7*)

where pigeons, flowerpeckers, and starlings fed and, more important, these little parrots. Apparently they are usually solitary. Even when a number gathered in one tree they betrayed their unsociability by making pugnacious rushes at each other. One, seeing me, cocked its head inquiringly and gave a high, thin "tic-tic-tic-tic" of disturbance. In clambering about and reaching for fruit they seem to have no regard for gravity, but climb, feed, and rest oriented most any way.

One day, crossing a marshy swale, Dr. Rabor and I came on a small herd of carabao, turned loose to graze because they were not needed in agricultural work in the dry season. The great, ungainly beasts put up their heads, sniffed, and began to come closer through the reeds. Perhaps it was only to get a better view, but perhaps, as Rabor said, they thought we were the people who brought them salt. But looking at their horns and their unresponsive faces, thoughts came to me of stories I'd heard of people attacked by carabao. They can be dangerous. We started away, but this seemed to spur the carabao to faster action. I looked about for the nearest tree. But Dr. Rabor stopped, spoke to them, in Visayan, and then came on leaving the carabao standing, staring.

The forest patches interested us particularly. These were magnificent forests left on the rougher ground, not suitable for farming. In the typical forest there were three "stories" or "canopy" layers. The tops of the tallest trees gave a canopy of leaves high overhead, perhaps 100 feet or more up. Below this, a stand of lower "undergrowth" trees gave the second canopy, from 50 to 70 feet above the ground, while nearer the ground was yet another layer. The ground was fairly clear of obscuring vegetation, and we could see far among the trunks. One day we watched a pitta, a red-breasted, green-backed ground bird of the forest floor that was undecided about fleeing. It hopped back and forth and, to stress its agitation, it depressed its absurdly short tail and flicked it up again. In a bird with a longer tail, or with bright tail-markings, some social significance might be postulated, but it seems strange in a bird with such an insignificant tail. Another time we saw, as part of a bird party, a magnificent crested blue monarch flycatcher, a bird so rare that even Dr. Rabor had only seen one once before. Several times we saw the spotted forest kingfisher and rough-templed babbler with yellow "ear tufts," both Negros endemics. The magpie robin's sweet whistled song, infrequently heard, was the finest voice of the forest, but the background of bird-song was that of the dull-colored bulbul, whose pleasant song has a placid pleasantness that I learned to enjoy.

NEW MEMBERS

The following persons became Museum Members from January 8 to February 12:

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Lambert Bere, James W. Close, Frank G. Hough, Dr. Arthur Loewy, DeWitt J. Manasse

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On Sunday Afternoons . . .

THE MUSEUM'S OWN STORY ON DALLWIG PROGRAM

The origin and history of museums, of which little is known to the average layman, will be discussed on Sunday afternoons in March by Paul G. Dallwig, the Layman Lecturer, under the title "Behind the Scenes in Our Museums." Mr. Dallwig will trace the development of the modern museum from its beginnings to its present place as an important research institution for both scholars and laymen. He will discuss the place of museums in our educational system, their value to the community, and the probable lines of their future development. The lecture will be illustrated with selected exhibits in this Museum that show the modern trend in illumination, art, color, and techniques. The same lecture will be given at 2 P.M. on each Sunday of the month —March 7, 14, 21, and 28.

Museum Members are admitted to these lectures upon presentation of their membership cards; others must make reservations in advance by mail or telephone (WAbash 2-9410).

Panorama of America Offered in Audubon Screen-Tour

Color motion-pictures of a 50,000-mile journey around America will be shown on the program, "America the Beautiful," to be presented by the Illinois Audubon Society in the James Simpson Theatre of the Museum on Sunday, March, 14, at 2:30 P.M. The accompanying lecture will be given by Tom and Arlene Hadley, well-known team of naturalists of Holly, Michigan.

Gifts to the Museum

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Hughston M. McBain, Chicago—Japanese sword, 17th century, Japan

Department of Botany:

From: Dr. F. R. Fosberg, Washington, D.C.—55 algae, Marshall Islands; Albert J. Franzen, Chicago—3 cryptogams, Illinois; Dr. D. Hilliard, Anchorage, Alaska—36 algae, Alaska; Dr. N. Ibanez, Trujillo, Peru —24 algae, Peru; Dr. Hugh Iltis, Fayetteville, Ark.— 66 algae, Arkansas and Costa Rica; Dr. L. B. Isham, Coral Gables, Fla. —27 algae, Florida; Institute of Jamaica, Kingston, Jamaica—35 algae, Jamaica; S. C. Johnson and Son, Inc., Racine, Wis.—Copernicia material, Paraguay and Brazil

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 4-April 1954
Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

LEON L. WALTERS RETIRES AFTER 43 YEARS AT MUSEUM

Leon L. Walters, who began working at this Museum in 1911, closed a 43-year career of taxidermy and sculpture on the staff of the institution with his retirement on pension on March 31. Like Leon L. Pray, former staff taxidermist, Mr. Walters was a pupil of J. D. Allen, of Mandan, North Dakota.

Mr. Walters is known as one of the country's outstanding artists in the field of taxidermy. He is the inventor of the Walters process, a method of taxidermy he began to use in 1915. This process meets the difficult problem presented in the preparation of certain types of animals whose hairless or almost hairless skins cannot be satisfactorily preserved in lifelike condition by the conventional methods of mounting their skins. By the Walters taxidermic process, these animals are reproduced in colored plastics that are painted on the inside of plaster molds made from the original specimens and later removed. The plastic layer is really a replica of the skin. The method is applied principally to snakes and other reptiles, to amphibians such as frogs and salamanders, and even to such large mammals as the hippopotamus and rhinoceros. It is also used for parts of other animals—faces, feet, etc.—in combination with mounting of the actual skin of the torso.

Walters, born in Portland, Jay County, Indiana, attended schools there and in Evanston, Illinois. He studied sculpture and painting at the Art Institute of Chicago and joined the staff of this Museum as an assistant in zoology in 1911, shortly after completing his art studies.

Mr. Walters has been a member of various Museum expeditions. In 1923 he accompanied Dr. Karl P. Schmidt (now Chief Curator of Zoology) on an expedition to British Honduras and Honduras to collect material for a habitat group of crocodiles. He collected alligators in Georgia in 1925 and various reptiles in the Southwest in 1937 and in Florida in 1939. In 1941 he was a member of a Museum expedition to the Galapagos Islands that was sponsored by Leon Mandel, of Chicago, and conducted from the latter's yacht. Mr. Walters is the author of pamphlets and articles in museum technical journals describing the plastic taxidermic process he invented. On the side he has collected birds, mammals, and American Indian archaeological material. Some of this collecting was done while he was homesteading a section of land in eastern Montana, during a period of absence from the Museum. He has also developed techniques for models of agricultural products, prosthetics for amputees, and a laminated gun case that was accepted in 1944 by the Smaller War Plants Corporation, a government agency.

LAST MUSEUM TASK

Finishing touches are put on specimen for habitat group of the Malay tapir from Siam by Staff Taxidermist Leon L. Walters, whose retirement on March 31 ended 43 years of service to the Museum.

MUSEUM CO-OPERATES IN STUDY OF RABIES

Chicago Natural History Museum, through its Curator of Mammals, Colin Campbell Sanborn, who has been appointed a special consultant to the Communicable Disease Center of the U. S. Public Health Service, is actively co-operating with health authorities in the study of rabies infection in bats. There have been but two cases in the United States, neither near the Chicago area, and, although the condition is not considered serious, it is being carefully watched. The Museum is identifying all bats collected by health authorities in surveys of infection in this mammal.

Curator Sanborn presented an illustrated lecture on "Bats—Their Distribution and Habits in North America" before the Southeastern United States Rabies Conference, which was sponsored by the Communicable Disease Center of the U. S. Public Health Service and the Florida State Board of Health in Tampa on March 19. He then inspected the laboratories in Montgomery, Alabama, where the reaction of bats to rabies is being studied, and visited the CDC Headquarters in Atlanta, Georgia.

THIS MONTH'S COVER

Although the native habitat of the purple rhododendron lies in the mountains extending from Georgia to Virginia, the flowering branch seen on our cover will be in permanent bloom in a different habitat—Hall 29 (Martin A. and Carrie Ryerson Hall, Plant Life) of the Museum. This model of rhododendron—for that, and not the live plant, is what our cover shows—was made by Emil Sella, Curator of Exhibits, assisted by Frank Boryca, Technician. Curator Sella collected specimens of this rhododendron last spring when it was in bloom in the Great Smoky Mountains of Tennessee. When he returned to his work at the Museum he fashioned out of plastic and glass the blossoming branch that, with its lustrous green leaves and subtly shaded flowers, brings a touch of Smoky Mountain spring to Chicago.

Illinois Audubon Society Offers Screen-Tour on April 25

Cleveland P. Grant well-known naturalist and former member of the staff of Chicago Natural History Museum, will present a screen-tour with color motion-pictures for the Illinois Audubon Society on Sunday, April 25, in the James Simpson Theatre of the Museum at 2:30 P.M. The subject is "Wildlife of Marsh and Mountains."

Admission is free to the general public; members of either the Museum or the Audubon Society may obtain reserved seats by presenting their membership cards before 2:25 P.M.

WEST FRONTIER INDIANS PORTRAYED IN EXHIBIT

By GEORGE I. QUIMBY
CURATOR OF EXHIBITS, ANTHROPOLOGY

Since 1894 Chicago Natural History Museum has owned an important but little-known collection of rare paintings by George Catlin, who was famous for the western scenes and Indian portraits that he painted more than one hundred years ago. The Museum's collection consists of thirty-five oil paintings of Indians and scenes of the western frontier painted by Catlin between 1831 and 1837. Most of the pictures were painted along the upper Missouri River in 1832.

During April the Museum will display a selection of its Catlin paintings in a special show entitled "Indians of the Western Frontier." The special exhibit of more

SIOUX INDIAN CHIEF
Portrait painted by George Catlin in 1832.

than twenty pictures will be placed in Stanley Field Hall. Other Catlin paintings are on permanent display in the regular Indian exhibits in Hall 5 (Mary D. Sturges Hall) and Hall 6.

Catlin received considerable encouragement and aid from General William Clark (famous for his part in the Lewis and Clark Expedition to the Pacific), who was then governor of Missouri and Superintendent of Indian affairs for the western regions, as well as from Clark's nephew, Major Benjamin O'Fallon, who was Indian agent. The Museum's collection of Catlin paintings was formerly owned by Major O'Fallon and probably General Clark. The collection was sold to the Museum by Miss Emily O'Fallon, daughter of Major O'Fallon and grandniece of General Clark. These paintings had been in the O'Fallon home, "Indian Retreat," in St. Louis until 1861, when they were packed up and put into storage until purchased by the Museum in 1894.

How this Museum came to purchase the O'Fallon collection is an interesting story that can be reconstructed from letters in the files of the Museum.

On December 4, 1893, Miss O'Fallon wrote a letter to her friend Mrs. Ulysses S. Grant, stating that the O'Fallons "wished to dispose of" their paintings of Indians and requesting the aid of Mrs. Grant in bringing this collection to the attention of the "Museum Directors of Chicago." Soon after receiving this letter Mrs. Grant wrote to Mrs. Potter Palmer in Chicago, who relayed the information to Harlow N. Higinbotham, a Trustee of the Museum. Mr. Higinbotham negotiated directly with Miss Emily O'Fallon, and the paintings were purchased by the Museum on December 10, 1894.

FOUR SATURDAY LECTURES OFFERED IN APRIL

Illustrated lectures in the spring course on science and travel will continue on the four Saturday afternoons in April. The lectures, provided by the Edward E. Ayer Lecture Foundation Fund, are given in the James Simpson Theatre of the Museum at 2:30 P.M. Because of limited accommodations, it is necessary to restrict admission to adults. For children, free motion-picture programs are given in the Theatre on the mornings of the same Saturdays under the auspices of the Raymond Foundation.

Following are the dates, titles, and lectures for April:

April 3—Italian Interlude
Dr. J. Gerald Hooper

April 10—Once Upon an Island
Robert C. Hermes

April 17—Turkey
Karl Robinson

April 24—Wildlife of Wisconsin
Cleveland P. Grant

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

Daily Guide Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

FLYING LIZARD RIVALS PHILIPPINE BIRDS

By AUSTIN L. RAND
CURATOR OF BIRDS

(This is the last in a series of articles on Dr. Rand's observations during his recent study trip to the Philippines. Drawings illustrating various phases of life on the islands appear on pages 4 and 5.)

SOME PEOPLE regard museum curators as men who study dry bones and dusty skins, and think curators themselves are dry as dust. I reflected on this sardonically while in camp in the mountains of Negros in the Philippines. A magnificent forest exists there, but such a forest needs moisture. In camp there were driving rains, the mosses were like wet sponges, the trails were soaked and slippery, and sodden skies dripped ceaselessly. No curator could be dry and dusty there for long—I was wet and muddy most of the time.

I lived awhile on the edge of a different, drier forest at Lilo-an on Siquijor Island. It was here I saw the flying lizard fly. It was about three feet up on a twelve-foot tree stub—a slender creature with head and body about three to four inches long. It pulsed the loose gular skin of its throat as it climbed. I thought it would "fly" from the top of the stub, but it jumped a foot or so to a tender sapling and climbed nearly to the top, about 18 feet up. Then off it went in a flat jump of three or four feet. It spread its "wings" (specialized flaps of skin that when folded reach about from fore to hind limb and are inconspicuous, but when expanded make an oval gliding surface on each side). The downward course was checked and the glide was nearly level to the trunk of a nearby tree. I measured the distance—about fifteen feet from sapling to tree—and the lizard lost only an estimated five to six feet of altitude in this distance. With greater altitude these lizards jump several times as far.

NEW COLLECTING-GROUND

Siquijor is a small islet, about ten miles across. Its interest to me was its poor fauna and the effects of the island's small size on habits and speciation. Once a forested island, presumably, there still are tiny patches of forest in the south. As no collecting had been done here previously, my associate, Dr. D. S. Rabor, and I went to work.

January was in the dry northeast-monsoon season. The only water for a mile or so each way from the farming area called Lilo-an was the village well. Lines of people and cattle to and from the well were a morning and evening sight.

There are gradual beaches and even bits of mangrove on Siquijor. Off the forest there is a broken cliff of 100 feet or more

(Continued on page 6, column 1)

PHILIPPINE SKET

Chicago Natural History Museum's 1953-54 Philippine Study Trip resulted in collections of specimens, notebooks filled with data, and a sketchbook of studies by Dr. Austin L. Rand, Curator of Birds. From Dr. Rand's field sketches Miss Ruth Johnson made the drawings presented here.

↑ The Science Building of Silliman University, in Dumaguete, where Dr. D. S. Rabor (Field Associate of the Museum) teaches, and where Dr. Rand made his headquarters.

TOWN

A small village near Dumaguete, showing houses and a small Sari-sari (general) store. Prominently displayed are strings of bananas and jars of "tuba," a popular coconut drink. →

↑ The residence of Dr. Rabor, who was host to Dr. Rand while in Negros.

↑ The edge of the Sulu Sea. Coconut palms lean into the monsoon, and the shallow inshore water is incredibly pale, brilliant green-blue.

COUNTRY

↑ Cock-fighting is a favorite Filipino sport, and a fighting cock, carried on a man's arm, is a familiar sight.

Carabao, or water buffalo, love to bathe in mud, and here we have one in a buffalo wallow. ↓

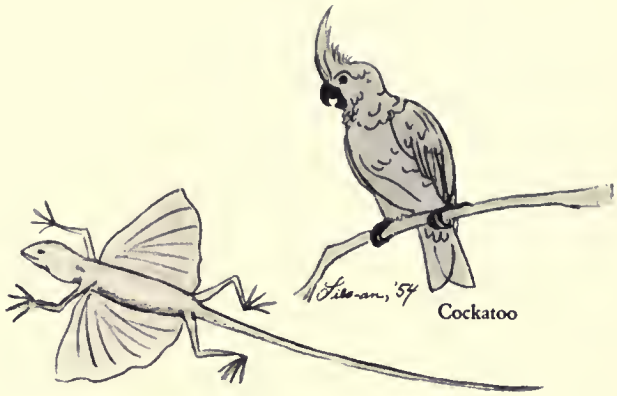
↑ Lake Balinsasayo—a view from Silliman University's Biological Station veranda, with the caretaker's home in the foreground.

A cornfield, with a small shelter from which people watch for marauding monkeys, ready to chase them from the ripening corn. →

HES FROM NEGROS

FOREST

↑ At higher altitudes, tree ferns and epiphytes are common.

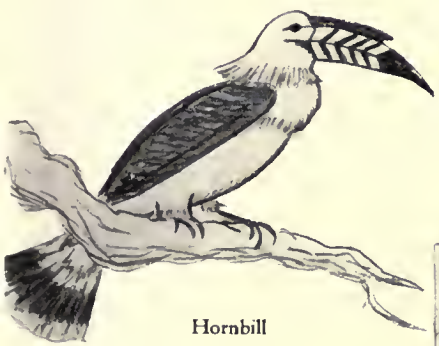


Cockatoo

Flying Lizard

↑ Lowland Philippine forest, in typical three-story formation: the tallest trees give the topmost canopy, trees of intermediate height make a second story, and the shortest trees provide the lowest story.

Philippine Macaque

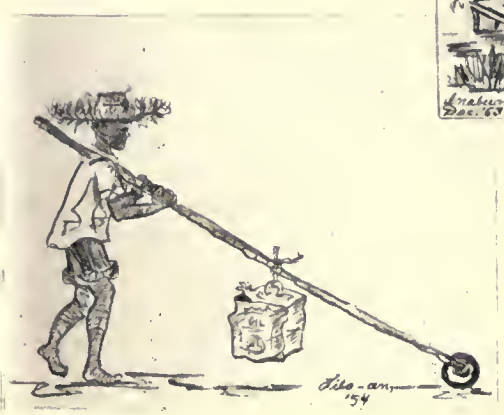


Hornbill

↑ Many lowland trees are characterized by wide flaring buttresses.

CAMP

↑ Camp on the Inaboanga-Sicopon River, where with Dr. Rabor, his family, and a group of biology-major students Dr. Rand spent Christmas.



← A local water-carrier.

Preparing a meal. →

PHILIPPINES—

(*Continued from page 3*)

that fronts the sea. This was the first forest I ever worked in where fruit bats were common throughout. A medium-sized species slept singly or in couples hanging up in the lower canopy, and these bats were continually flying ahead of us. They were of a species that feed, fight, and squeal amid the small green fruits in the kapok trees each night. A large species of fruit bat also occurred, with a community roost in a big tree about 300 yards from camp, and from this the bats spread out each evening to do their feeding.

Some of the cornfields still had dried bleached stalks standing. How different were the birds in them from the birds of a cornfield in the United States. Instead of bluejays, blackbirds, and pheasants, there were white cockatoos, which, the people told us, compete with the human population for the younger ears of corn. Wood-swallows and bee-eaters, both of groups unknown in the New World, used the cornstalks as vantage points from which to fly out and capture large insects on the wing. Still more incongruous was a medium-sized kingfisher whose favorite perching places were fence-posts along the cornfield where it watched for insects and lizards on the ground.

GIANT FOSSIL CLAMSHELLS

Near the forest the limestone is close to the surface. It's still closer in the forest, and this probably has saved the trees. An incidental result is that the cornfields near the woodland are rich in fossil giant clamshells (*Tridacna*). The shells or fragments of these huge bivalves, more than two feet long, seem to resist disintegration better than the rock in which they're embedded.

As in so many places in the tropics the introduced shrub, lantana, forms great masses on wasteland. These harbor many birds. The bright orange-red flowers are favorite feeding places of the yellow-bellied sunbird, and the ripe fruits are one of the foods of the glossy starling, an all-black bird with an eye so brilliantly red that in the sunshine it looks like an added adornment. A lantana patch near camp was a favorite roosting place for the little black-and-brown weaver bird that roams the countryside in loose flocks in search of weed and grass seeds on which to feed. On our first two mornings here a dark peregrine falcon, relative of our duck hawk, swept over our dooryard throwing the hens into a panic. It's a dark endemic form of falcon we would have liked to collect, but in a watch on subsequent mornings we failed to find it. However, we did see another chicken predator in action. It was a crow, indistinguishable in the field from our crow except perhaps by voice. "Wak" the natives call it, and that's a very good rendition of its call.

The bird fauna of the forest is poor here. There are none of the woodpeckers, hornbills, nuthatches, chickadees, or leaf-warblers so characteristic of many Philippine forests. It's interesting to see a well-developed forest with so many ecological niches empty. Because species are few, one would expect the few that do occur to be exceptionally abundant compared with their status on the larger islands, but this does not seem to be the case.

Bird song is not noticeable, which is to be expected on a small island with a poor fauna. The birds do not need song to prevent species mixup at breeding time. In the forest there is always the chatter of the bulbul, which is harsher than that of its relative on Negros, and the bird is less given to singing than that on Negros.

The screeching of cockatoos is also a familiar sound. The babbling of the rufous and black coucal (a cuckoo) and the loud *gua-how* followed by a chuckle of the black koel (another cuckoo) also sound in the forest. The only real songster is a black-and-white thrush, *Copsychus*, that has a series of fine sweet whistles that would rate it a songster in any company.

MONOTREMES, MARSUPIALS BYPASSED BY EVOLUTION

By BARBARA POLIKOFF

Several members of the blue-jean set were standing in front of the new exhibit in Hall 15 when I went to see it for the first time. Their remarks, coming one on top of another, many having nothing to do with the exhibit at all, caused a small clamor that would have made a disciplinarian's heart sink. But I managed to hear the comment of one boy who had just discovered that the new-born opossum finds its way into its mother's pouch when it is so small that it can fit comfortably in a teaspoon. After he had absorbed the full wonder of this discovery he announced to one of his colleagues, "Someday I'm going to study this stuff." In the age when jet planes and deep-sea diving has excited the ambitions of so many boys, this is quite a tribute.

THEME IS PRIMITIVISM

The new exhibit, planned by D. Dwight Davis, Curator of Vertebrate Anatomy, and prepared by Joseph B. Krstolich, Artist, is devoted to explaining the remarkable features of the two most primitive groups of mammals: the monotremes (most famous is the duck-billed platypus) and the marsupials (best known is the kangaroo). Unlike modern mammals such as the dog and the horse that give birth to fully formed offspring, the animals belonging to these two groups have a much more primitive reproductive cycle. The monotremes lay eggs and are in this respect more like reptiles than mammals. The marsupials, a step above the monotremes in the evolutionary scale, do not lay eggs but they still lag behind the modern mammals. As the small scholar discovered, their offspring are so undeveloped at time of birth that they require the protection of the mother's pouch for several months before they can venture out on their own.

The monotremes and marsupials have other characteristics that indicate their primitivism. A comparison of the shoulder girdle bones of a monotreme with those of a lizard shows that there is a close resemblance between the two, much closer than the resemblance that exists between the bones of monotremes and mammals. The opossum, a marsupial that is as large as a cat when it is full grown, has a brain that is practically devoid of convolutions, resembling the brain of a lizard more than that of a cat. The convoluted brain is found in the mammals that go beyond the marsupials in the scale of evolution.

FLOURISHED IN THE AMERICAS

As the section of the exhibit devoted to zoogeography shows, about 80 million years ago marsupials and monotremes flourished in North and South America as well as in Australia and New Guinea. At that time there was no connection between any of these land areas. When modern mammals developed in North America, they completely dominated the more primitive marsupials, wiping them out except for the persistent little opossum that was somehow able to survive the onslaught. When a connection was established between North and South America, the modern mammals traveled from north to south and obliterated the majority of the marsupials that flourished there. Because Australia and New Guinea are still isolated as they were 80 million years ago, marsupials still exist there in great variety.

The flying squirrel, a modern mammal, and the flying phalanger, a marsupial, are included in the exhibit as a good example of a common but nonetheless extraordinary phenomenon—that of two animals that closely resemble each other although they belong to different groups that are found in different parts of the world, the result of parallel evolution that occurs when animals have similar habits.

PLEASE NOTIFY MUSEUM IF YOU'RE MOVING

Members of the Museum who change residence are urged to notify the Museum so that the BULLETIN and other communications may reach them promptly.

Members going away for extended periods may have Museum matter sent to their temporary addresses.

GROWING TV DEMANDS MET BY MUSEUM

The demands of television stations and networks for program material based on exhibits and research of the Museum or on Museum staff personalities are constantly increasing. Frequent requests for the institution's co-operation in presentation of educational subjects come from both public-service divisions of TV organizations and commercially sponsored programs. Indications are that the current calls upon Museum facilities represent only a fraction of what may be expected when Chicago's projected educational TV station WTTW goes into operation on Channel 11.

In just three weeks (beginning February 21) staff members of the Museum constituted the casts of two complete half-hour television programs and were major participants in two other programs. Material was furnished from Museum resources for use as props on a fifth.

The biggest tribute to Chicago Natural History Museum as an institution was the program on February 21, for which it was chosen to represent the vital place of all museums in American life and culture. This program was in the series presented by the Sloan Foundation, which each week, under the title "American Inventory," stages an audio-visual "profile" of one of the elements that contributes to the greatness of the United States. The telecast was over the network of the National Broadcasting Company. Participating in the program were Colonel Clifford C. Gregg, Director; Dr. Paul S. Martin, Chief Curator of Anthropology; Dr. Theodor Just, Chief Curator of Botany; Dr. Sharat K. Roy, Chief Curator of Geology; and Dr. Karl P. Schmidt, Chief Curator of Zoology.

The thread of the Museum story and the transition from one natural science to another were carried by Colonel Gregg and Hugh Downs, NBC commentator. Scenes were shifted to a representation of a laboratory in each scientific department where each of the Chief Curators, with specimens and equipment, was able to demonstrate some of the basic purposes and accomplishments in his particular science. The program as a whole showed how each of the sciences interweave with the others toward achieving definition of the story of the earth and its life.

On March 7, Bryan Patterson, Curator of Fossil Mammals, was the featured speaker on "Live and Learn," educational television series of station WNBQ. In a half-hour lecture with specimens and demonstrations he outlined the subject "Historical Evidence of Evolution." This series, considered among the top-ranking public-service programs, has presented other members of the Museum staff on a number of occasions in the past.

The work of the Museum's plant-reproduction laboratories was documented by Chief Curator Just as a guest participant in the Danny O'Neil Show on station WBKB (ABC) on March 9. Dr. Julian A. Steyermark, Curator of the Phanerogamic Herbarium, was a guest on John Ott's program, "How Does Your Garden Grow," over station WNBQ on March 14. The fifth program, in which the Museum was represented by material from its anthropological collections was "New Horizons" on station WBBM-TV. On this program faculty members of universities and colleges in the Chicago area appear each week, and frequently they rely on material from the Museum to illustrate their subjects.

Spot announcements of Museum exhibits and activities continue in the daily schedules of all four Chicago television stations.

PLANT FROM GUATEMALA MAKES U.S. DEBUT

Brought from the wilds of the land of the Mayas to urban Chicago, an attractive red-flowered plant made its "formal debut" in North America on March 14 over television on Station WNBQ (NBC, Channel 5). The plant was introduced to the United States on John Ott's Sunday-afternoon program "How Does Your Garden Grow?" by Dr. Julian A. Steyermark, Curator of the Phanerogamic Herbarium at the Museum, who had brought back a living plant from his second expedition to Guatemala.

WANTED: A POPULAR NAME

Plant brought from Guatemala that is currently being introduced into horticulture in the United States. It was obtained by Dr. Julian A. Steyermark while on a Museum expedition.

Known to the scientific world as *Columnea stenophylla*, this plant is a member of the same family (Gesneriaceae) to which also belong the African violet (*Saintpaulia*), *Episcia*, *Gloxinia*, and *Achimenes*, all well-known to flower-lovers. Originally discovered in 1926 in Chiapas, Mexico, the plant was found later in Guatemala in 1940 on the slopes of a volcano in that country.

Curator Steyermark found it on both of his expeditions for the Museum on two different volcanoes (Santa Clara and Atitlán) in dense tropical rainforest at elevations varying from 3,000 to 5,000 feet. He brought back living plants in 1942 and through the efforts of the growers at the conservatories of the Chicago Park District (Garfield Park, Lincoln Park, and Marquette Park), plants were restored to health and flowered.

In cultivation this plant is much more striking than in the wild state. Its numerous scarlet trumpet-like flowers, 4 to 5 inches in length, appear along the stem from top to bottom and blend beautifully with the lustrous dark-green willow-like leaves. The flowers last a long time. A plant blooms continuously for at least two months, the best blossoming usually occurring around St. Valentine's Day. However, the plant starts blooming around New Year's and lasts until Easter. As the plant grows well under house conditions, it is expected that eventually it will become very popular. It will soon be introduced to various growers for distribution to the public.

"The history of the introduction of this plant to the public illustrates how scientific expeditions may contribute new and unusual ornamental plants that add to the world's gardening and horticultural enjoyment," says Curator Steyermark. The television audience is being given the opportunity of selecting a common name for the plant.

FREE CHILDREN'S MOVIES ON APRIL SATURDAYS

Free movie-programs for children will continue each Saturday morning during April under the auspices of the James Nelson and Anna Louise Raymond Foundation. All programs begin at 10:30 A.M. in the James Simpson Theatre of the Museum. Titles and dates of the remaining films follow:

April 3—So Dear to My Heart
(Disney film-story of a boy and his black lamb)

April 10—The Grass Forest
Robert C. Hermes, narrator

April 17—Jordan Valley (Biblical Lands)
Also a cartoon

April 24—Wheels Across Australia
Also a cartoon

Children may come alone, accompanied by adults, or in groups from schools, clubs, and other centers. No tickets are needed.

BILLION YEARS OF LIFE IS DALLWIG TOPIC

The world of hundreds of millions and even billions of years ago will be dramatized in "Nature's 'March of Time'" to be presented at the Museum on three Sunday afternoons in April by Paul G. Dallwig, the Layman Lecturer. Mr. Dallwig will appear on April 4, 11, and 25 (there will be no lecture on Easter Sunday).

The story of strange long-extinct forms of plant and animal life, of which only fossils remain today, will be told. The audience will re-live the adventures of fossil-hunting expeditions to the Gobi Desert and elsewhere. "Visits" will be made to a 250-million-year-old Coal Age forest and to the La Brea tar-pits of California to witness the plight of prehistoric monsters in their death trap. The lecture is climaxed with the dramatization of a fight between two giant dinosaurs, Tyrannosaurus and Triceratops.

Museum Members are admitted to these lectures upon presentation of their membership cards; others must make reservations in advance by mail or telephone (WAbash 2-9410).

NEW MEMBERS

The following persons became Museum members from February 15 to March 12:

Non-Resident Life Member

Ross Tarrant

Associate Members

Robert V. Brost, Paul Gibson, Mrs. Ruth M. McReynolds, William W. Whitnell

Sustaining Members

Edwin C. Austin, Rosecrans Baldwin, Jay Berwanger, John B. Lewellen, Jay Sheridan, T. R. Sorensen

Annual Members

Anthony G. Allison, Carl W. Bahr, A. C. Bailey, Anthony W. Bakken, Mrs. Scammon Barry, Frank G. Bavirsha, James B. Braun, Charles K. Buckels, S. T. Cohen, Henry Conedera, W. D. Cross, Jr., Arnold C. Crowl, Walter L. Darfler, Dr. Sol T. DeLee, Lyman W. Dixon, Warren Everote, C. B. Fiduccia, Dr. Carl R. Freberg, David Golber, James L. Gossman, Charles L. Hardy, Bernhart Haugen, James C. Hoover, T. V. Houser, S. L. Jewell, E. F. Johnstone, Jr., George W. Jones, George M. Keane, Robert H. Kent, Gordon Lang, Mrs. H. A. Leeb, Orrin S. Leslie, George Lill II, Edward C. Logelin, Dr. Karl A. Meyer, F. W. Michaels, J. Bernard Mullen, George Nielsen, Marc T. Nielsen, C. A. Nordberg, Harold J. Nutting, John B. O'Connor, John E. Owen, Frank J. Pasco, Mrs. Sara Z. Pritikin, Mrs. John A. Prosser, Colonel John C. Raaen, Lester G. Rees, Joseph Regenstein, Jr., W. R. Riggs, Herbert W. Rumsfeld, Benjamin Saks, S. J. Samuels, Erich F. Schmidt, Leo C. Sheldon, Lewis Shere, Dr. Louis D. Smith, Albert A. Sommer, Stanton H. Speer, W. L. Summers, Dean Terrill, Joseph W. Towle, Dr. M. P. Urnes, Donald J. Walsh, William H. Warner, Dr. Louis Yesnick

STAFF NOTES

Bryan Patterson, Curator of Fossil Mammals, and **Orville L. Gilpin,** Chief Preparator of Fossils, will leave April 5 on a two-month field trip to northern Texas, where they will collect fossils of Early Cretaceous age in deposits that have already proved rich in their yield of fossil mammal and other vertebrate remains . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, conducted a seminar at the graduate school of the Henry Shaw School of Botany, Washington University, St. Louis, on "Vegetation of the Venezuelan Guiana." He also spoke before the Barrington (Illinois) Natural History Society on "Plants and Animals Found in the Lost World of Venezuela." . . . **Colin Campbell Sanborn,** Curator of Mammals, recently spent a week at the U. S. National Museum, Washington, D.C., and the American Museum of Natural History, .New York, in connection with his work on a catalogue of the bats . . . . **Miss Miriam Wood,** Chief of the Raymond Foundation guide-lecture staff, attended the national convention of the Department of Audio-Visual Instruction of the National Education Association held in Chicago last month. She acted as consultant at a session on "Museums as School Resource Centers." **Miss Nancy Worsham** and **Mrs. Jean Shultz,** Raymond Foundation guide-lecturers, attended sessions of the North American Wild Life Conference . . . **Donald Collier,** Curator of South American Archaeology and Ethnology, and **George I. Quimby,** Curator of Exhibits–Anthropology attended the meetings at Purdue University of the Central States Anthropological Society. Mr. Collier is president of the organization . . . . **Mrs. William (Audrey Greeley) Rhine,** Reference Librarian, has resigned to devote herself to a career as a homemaker.

Gifts to the Museum

Following is a list of some of the principal gifts received recently:

Department of Botany:

From: Holly R. Bennett, Chicago—175 miscellaneous phanerogams, Rosebud County, Mont.; G. W. Lawson, Achimota, Gold Coast, Africa—62 algae; R. A. Lewin, Halifax—14 algae, Nova Scotia; R. E. Schultes, Cambridge, Mass.—3 phanerogams, Colombia; Dr. Earl E. Sherff, Chicago—19 photos of Hawaiian plants; Floyd A. Swink, Chicago—52 phanerogams; Josephine E. Tilden, Lake Wells, Fla.—32 algae; Archie Wilson, Flossmoor, Ill.—a Bumelia lanuginosa, Texas; Mrs. Marion Wolf, Lafayette, La.—40 fruits of *Liquidamber styraciflua* and 5 fruits of *Trapa natans;* Dr. Walter B. Kiener, Lincoln, Neb.—196 Characeae; Dr. P. Killip, Washington, D.C.—90 algae, Cuba and Florida; Dr. Ira LaRivers, Reno, Nev.—185 algae; Dr. J. Mabille, Aisne, France—8 algae; Dr. Grace C. Madsen, Tallahassee, Fla.—206 algae; Dr. E. T. Moul, New Brunswick, N.J.—9 algae, Gilbert Islands; J. Newhouse, Honolulu, Hawaii—138 algae; Dr. Chester S. Nielsen, Tallahassee, Fla.—81 algae; Dr. J. M. Orozco, San José, Costa Rica,—17 algae

Department of Zoology:

From: Dr. Henry Field, Coconut Grove, Fla.—collection of sea shells, Dubai, Trucial Coast, Persian Gulf; Florida State Board of Health, Jacksonville, Fla.—104 bats, Georgia; Squadron Leader Marshall Laird, Lauthala Bay, Fiji—5 bats in alcohol, Aore Island, New Hebrides; Lincoln Park Zoo, Chicago—5 ticks from Echidna, captive; Museo de La Salle, Bogotá, Colombia—11 coral snakes, Colombia; W. B. Swanson, Sydney, Australia—12 turtles, Australia; U. S. Fish and Wildlife Service, Pascagoula, Miss.—47 lots of preserved fishes, northern Gulf of Mexico, and 2 marine sturgeons, Mississippi; Father A. Buch, French Indo-China—10 lizards and 20 snakes; Dr. R. L. Fleming, Kathmandu, Nepal—462 birdskins; Harry Hoogstraal, Cairo, Egypt—28 birdskins and 16 lots of fishes; D. E. Johnson, Provo, Utah—11 Bombyliid flies representing 6 species, western United States

Library:

From Dr. Jeanne S. Schwengel, Scarsdale, N. Y.; Miss Marion Yager, Oneonta, N. Y.; Container Corp. of America, Chicago; Langdon Pearse, Winnetka, Ill.; Robert Trier, Chicago

JUNIOR SCIENTISTS DISPLAY TALENTS AT MUSEUM

Results of the scientific endeavors of grade and high-school children were exhibited at a Science Fair held in the Museum on March 20 under the auspices of the National Science Teachers Association, Chicago branch. Creations entirely the work of young students were on display, including such things as a home-made 6-inch reflecting telescope, a miniature Stone-Age diorama, a model of an atomic pile, a garden-collected exhibit of insects, and "do-it-yourself" electronic devices. Schools of Chicago in the area from the Sanitary District Canal to North Avenue and of suburbs within 45 miles of the city were included. Schools of other parts of the city held similar science fairs at other civic centers. It is planned to make these science fairs an annual event.

Colombian Plant Research

Dr. José Cuatrecasas, botanist engaged in a research project of several years' duration at this Museum under the auspices of the National Science Foundation, recently made a tour of the east during which he studied plant collections from Colombia at the New York Botanical Garden, the Smithsonian Institution, Washington, D.C., and the Gray Herbarium of Harvard University.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 5-May 1954
Chicago Natural History Museum

Chicago Natural History Museum
FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

WHY WE NEED MUSEUMS

The basic reason for maintaining museums and for the pursuit of knowledge through the research conducted in them was succinctly stated by Benjamin Franklin when he wrote in *Poor Richard's Almanack:* "What signifies knowing the Names, if you know not the Natures of Things."

'Mayan Fire Plant' Wins in Name Contest

Responding to an invitation to send in their choice of a popular name for *Columnea stenophylla,* the plant that Dr. Julian A. Steyermark, Curator of the Phanerogamic Herbarium, introduced to the public on Sunday, March 14, on John Ott's television program "How Does Your Garden Grow?" (Station WNBQ, NBC, Channel 5), several hundred contestants wrote in selections ranging from "Scarlet African Violet" to names honoring Curator Steyermark. The name finally chosen was "Mayan Fire Plant," submitted by Ernest A. Kokoska of Hinsdale, Illinois. As an award, Mr. Kokoska received a potted specimen of the plant.

The winning name is most appropriate. It combines the historic land of the Mayas, in which the plant grows, with the red color of the flowers and the fiery volcanoes of this section of Guatemala. Announcement of the decision was made on the Ott program on Sunday, March, 21.

Annual Report of Director Going to All Members

The Annual Report for 1953 of the Director of the Museum to the Board of Trustees was published in April and distribution of copies to all Members of the Museum has begun. In the report, which fills a volume of 139 pages and contains 24 illustrations, Colonel Clifford C. Gregg, Director, gives detailed information on all phases of Museum activities during the year—expeditions, research, new exhibits, accessions, maintenance, financing, etc. It was printed by Chicago Natural History Museum Press.

Field Trip to Study Ants

A field trip to Louisiana combining research on insects and reptiles will be made early in May by Henry S. Dybas, Associate Curator of Insects, and Hymen Marx, Assistant in the Division of Amphibians and Reptiles. Dybas will devote himself particularly to investigation of the nesting system of the leaf-cutting ant, and Marx will make observations on vertebrate fauna associated with the nest colonies.

Fossil Collecting in Indiana

Dr. Rainer Zangerl, Curator of Fossil Reptiles, and William D. Turnbull, Preparator in the Division of Vertebrate Paleontology, made the first of a series of trips to a locality near Mecca, Indiana, in April. The site is an exposure of fossil-bearing black shale of Pennsylvanian age.

Important Shell Collection Revised by Dr. Haas

The Webb Collection of non-marine shells, which Chicago Natural History Museum purchased from Walter F. Webb in 1942, has now been completely revised, catalogued, and labeled. It took the Curator of Lower Invertebrates, Dr. Fritz Haas, eleven years to perform this duty, often, of course, interrupted by research work and by collecting trips. Now that the integration of the vast quantity of material into this Museum's collection has been finished, exact figures about the Webb collection are at hand. It consists of 19,374 lots of shells, some lots consisting of only one example, while others comprise numerous specimens. The number of paratypes is 559, that of types is 11. The large number of paratypes results from the fact that Mr. Webb could incorporate into his private collection such important collections as that of the late Gerard K. Gude of London and of the late John Ritchie, Jr., of Boston. The acquisition of such rich and precious material has raised this Museum's collection of shells to the level of the collection of the principal museums on the East Coast.

THIS MONTH'S COVER

The fast-stepping gentleman on our front cover is a Chinese shadow figure that has probably entertained many audiences in the courtyards of China. For the story of the ancient folk-art that he represents and the effects of the social and political changes of the 20th century upon this art, see the article on page 3.

NEW MEMBERS

The following persons became Museum members from March 15 to April 15:

Associate Members

Miss Edna T. Cowen, Carlton Hill, Harold R. Ray, Miss Mary Louise Tockstein, George H. Watkins

Annual Members

Edwin W. Ahern, Herbert R. Anderson, Carl Baechle, John T. Barlow, John H. Baxter, Charles M. Bell, R. D. Brizzolara, Mrs. Daniel C. Bryant, Homer J. Buckley, LeGrand Cannon, E. F. Chambless, Roswell H. Chrisman, Herbert B. Clark, I. Milton Cohn, John R. Cowan, Curt H. Dechert, John L. Dole, James M. Dow, Carl Dry, J. E. Duty, Mrs. Angela Ebzery, Miss Alice Eiberg, Miss Olga Eiberg, William L. English, Livingston Fairbank, Jr., Miss Mariana Field, C. R. Freeman, Miss Alice H. Gallagher, Edward Gudeman, Jr., Mrs. Virginia C. Halle, Dr. Ralph C. Hamill, Donald W. Hansen, Miss Margaret Higgins, Joseph H. Hinshaw, Cyrus E. Holland, John B. Holmes, Hjalmar W. Johnson, Clyde Kelly, Louis Kohn, Walter C. Krause, Dr. Henry E. Kritzer, Edwin A. Locke, Jr., Thomas E. Maddock, M. L. Magee, Arnold D. K. Mason, Richard McClung, William H. McDonnell, William B. McIlvaine, Dr. T. A. Melcarek, Earl A. Miller, Sidney J. Natkin, Edward J. Nell, Dr. Oscar B. Nugent, Klaus Ollendorff, Clarence Olsen, S. C. Owen, Niels Petersen, M. M. Philipsborn, Jr., Miss Irna Phillips, Edward H. Reese, Walter J. Reum, Keith P. Rindfleisch, Richard P. Robb, Dr. Edward J. Ross, Martin Rothschild, Derald H. Ruttenberg, Samuel J. Sackett, Miss Frances H. Sadauskas, Bernard G. Sang, E. D. Sawyer, Arthur H. Schomp, Robert M. Seeley, Millard D. Shriver, Warner Sivyer, George P. F. Smith, S. James Stiegel, Allen P. Stults, Mrs. Carroll Sweet, Merrill W. Tilden, Delbert N. Urick, Norman Vaughn, Charles F. Voytech, John M. Weaver, Vernon L. Wesby, William J. Whalen, Arthur L. Whall, Robert B. Whittaker, Russell M. Wicks, Howard L. Willett, Jr., Murray Wolbach, Jr., C. W. Wolf, Mrs. Elmer K. Zitzewitz

IENT SHADOW SHOWS OF CHINA BECOMING A LOST ART

By BARBARA POLIKOFF

IG-HEADED COMPANION and
/hite Snake Maiden were veterans
ess Chinese shadow shows before
iold Laufer, former Chief Curator
pology, secured them for the Mu-
ing the Blackstone Expedition to
id Tibet in 1908–10. Anyone
/ith the spectacle created by these
hadows as they move across the
ght have felt a momentary tinge
o see them taken from their native
nd held in the confines of a museum
t in the China of 1910 there were
ier shadow figures to take their

e case with most folk-art, the origin
adow show is obscured by legend.
pamphlet, *Oriental Theatricals*
Dr. Laufer stated that the first
f a shadow figure was made in the
Annals of Ssu-ma Ch'ien as far
21 B.C. The story is told in these
an emperor whose favorite con-
d died. To ease his grief he com-
is magician to summon her ghost
m. The magician, who had often
hat he could "bridle the flying
id visit the ends of the earth,"
y created an illusion of the girl
g a shadow of her carved likeness
of tapestry.

this story is not true, Dr. Laufer
ut that it reveals, in a general
t must have been the derivation
adow play: "The shadow figures,
ere the shadows or souls of the
summoned back into the world
t of professional magicians. This
n of ancestors as shadow-souls is
eristically Chinese that it goes far
he priority of this performance in
ts inception, therefore, is purely
and traceable to spiritualistic

PLAYS FOR ALL TASTES

e passed, shadow figures became
in dramas that were presented in
/ards of the wealthy or aristocratic
The women of these families were
by social custom to frequent the
restaurants, and other public
the city. They grew to depend on
iows to furnish an enjoyable con-
the world beyond their sheltered
o satisfy the varying interests of
ences the shadow showmen had to
types of plays: dramas of romance,
n, of the supernatural, of the comic.
ilt the repertoire of the more ac-
d companies grew to include as
several hundred plays, each or-
bout a half-hour long.

/ shows were perfectly fitted for
able type of staging required by
ling companies. The whole show could be carried on one cart, and within a very short time after arriving at a home the company of four or five showmen erected a wooden stage and put up a screen and theatre curtains. When all were assembled and the shadow figures were hung on a wire in the order of their appearance in the evening's performance, the curtains were pulled back, the screen was illuminated by an oil lamp (more recently by an electric-light bulb), and the first "actor" would appear to announce the beginning of the drama.

SCENE SET—READY FOR ACTION

As the embroidered curtains are drawn back from the screen the audience sees this scene set for the last act of a play called "The Lotus Flower Temple." As is usually the case with Chinese drama, this play has little plot. It presents a glimpse into the life of Peiping's younger set about 1750 and was still being shown in 1932 after a run of almost 200 years. (Photograph reproduced from "Chinese Shadow Shows" by Gertrude Wimsatt through courtesy of Harvard University Press.)

THE ART OF THE SHADOW

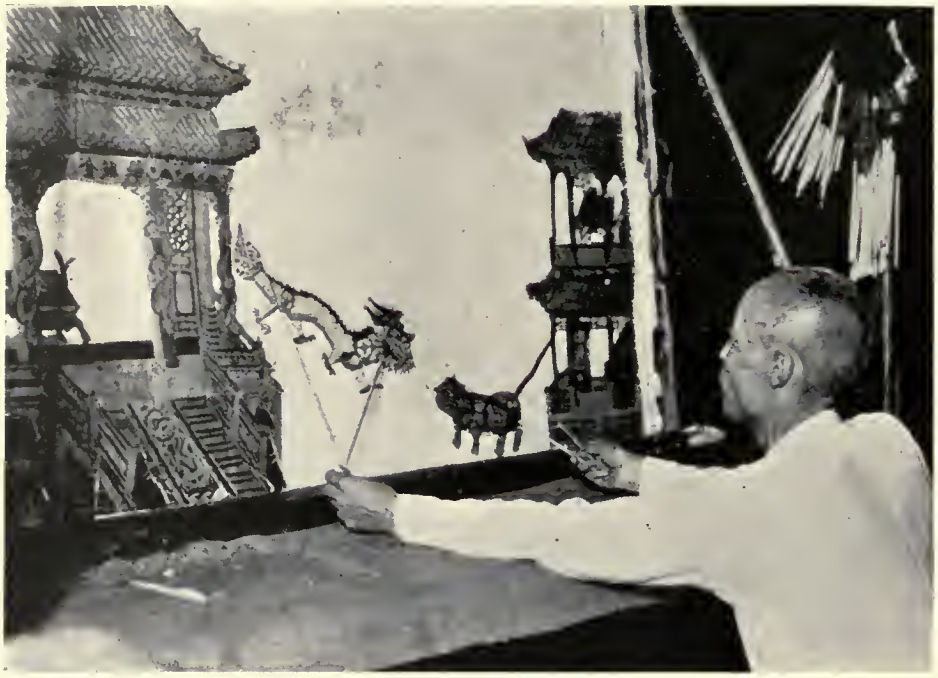
The shadow figures themselves are about 12 inches high, carved out of parchment, usually donkeyskin, cowskin, or pigskin, and stained with color. The bodies are jointed at the shoulders, elbows, wrists, and knees with knots of threads to allow complete flexibility. Similar to puppets, they are manipulated by means of wires attached to the neck and the tip of each hand.

To acquire the skill necessary to animate the shadow figures requires many years of practice, a fact that someone unfamiliar with the art might be surprised to discover. Benjamin March, a scholar of Chinese culture, explains the reason for this in a passage from his book on shadow figures: "Patterns of acting in the Chinese theatre are distilled and refined from centuries of observation of men and women; each movement is in nowise an imitation of one person's but rather the essence of action of all characters of a type. For the shadows, movement is similarly studied and correspondingly held to exacting standards. The servant and his master must be distinguished in every subtle gesture, in every rhythm of the body, in every step along the highway. And the animator must be skilled not only in one part but in all."

Unlike the drama of the Chinese legitimate stage that is presented without settings, shadow shows are usually very intricately staged. The props are carved out of parchment with as much attention to detail as is given to the shadow "stars" themselves. Comparatively small objects, such as tables or chairs, are usually made in groups and leaned against the screen. Larger and more elaborate props, such as temples and carriages, are pinned into place so that the showmen have only the figures to take care of once the scene is set.

FROM STAGE TO SCREEN

The plays produced by the shadow-show companies are usually those originally written for the legitimate theater. The important difference between the two presentations is that the legitimate play follows the highly literary language of the classical drama while the script of the shadow show is written in the colloquial language of the people. Some plays, usually folk tales, are originated by the shadow companies themselves and exist only in synoptic form, the individual companies filling in the parts as they see fit. As in motion pictures, the action of a drama is accompanied by music



BEHIND THE SCREEN

A highly skilled shadow showman as he stages a combat between a dragon and a tiger. The figures used in this ancient theatrical art are intricately carved, and stained in various tints so that the shadows they cast, seen by the audience on the other side of the screen, are colored and realistically detailed. In the right-hand corner of the picture the shadow figures can be seen as they hang on a wire in the order they are to be used in the evening's performance. (Photograph reproduced from "Chinese Shadow Shows" by Gertrude Wimsatt through courtesy of Harvard University Press.)

designed to lend emotional undertone to scenes of violence, sorrow, or happiness in which words would be cumbersome or absurd.

SHADOWS BEGIN TO FADE

Because of their unique function as domestic drama, shadow shows began to lose their popularity when the establishment of the Chinese Republic in 1911 led to a new concept of a woman's role in society. The taboos against appearing in public places began to disappear. Girls were given equal educational opportunities with boys, and the freedom to go where they wished led women to take a more active part in the activities of their cities and communities. The change was more rapid in the cosmopolitan centers than in the provincial areas, but before long even the most rural of towns was affected by the social changes taking place. There was soon little need for the women of China to depend on the shadow show to bring them the vital breath of the outside world.

Other reasons of course played their part in the decline of shadows. With the introduction of the motion picture, the shadow show lost its interest for those who preferred the more sophisticated entertainment provided by the "electric shadows"—the name the Chinese first gave to the motion picture. As fewer people called the shadow shows into their homes, fewer youths chose to become apprentices to learn the skill of animating the figures. Fewer and fewer people remained who could transmit the art of the shadow to the coming generation.

It is difficult to establish how many shadow-show companies still exist in China. In 1932 a visitor to Shanghai reported that all traces of the art had disappeared from cities that had formerly been shadow centers. In one or two of the centers shadow shows were reduced to seasonal entertainment, appearing on holidays and at festivals. It is safe to say that if they are to be seen in China today special arrangements have to be made by those familiar enough with the art to know where to locate the few surviving companies.

COMMUNISTS REVISE DRAMA

It is also likely that those few shadow shows that may still survive will have been affected, as have all Chinese arts, by the revising policy of the Communist government's Ministry of Cultural Affairs. This policy is explained by Mei Lan-fang, a famous Chinese actor, in an article written for a propaganda magazine published in Hong Kong. Mei explains that the Ministry is making revisions in all Chinese drama to remove the "backward, reactionary overlay it [drama] acquired in feudal and later in semi-feudal China."

Mei goes on to cite examples of themes that are considered "good" and those that are considered "bad" by the revising board. He writes: "Examples of good old plays which we continue to value highly are *The Fisherman's Revenge*, a forthright tale of a labouring man's battle against tyranny, *Mu Lan in the Army*, depicting the high patriotism of China's counterpart of Joan of Arc, and *Fighting the Chin Invaders*, showing the Chinese people's resistance against foreign invasion." Mei explains that a "bad" theme is found in a play that "projects a concept of personal virtue that is quite compatible with attachment to alien rulers against one's own people. Both performers and audiences in new China see that this is a harmful distortion of the proper relation between public duty and personal sentiment, so they no longer like the play."

It is interesting to note that Mei mentions that the play *The White Snake*, whose shadow-figure cast is on exhibition in the Museum, was one of the old plays that was revised erroneously by the Ministry of Cultural Affairs. "Inexperienced revisors," writes Mei, "with a dogmatic, unhistorical and unrealistic approach changed the snake-spirit in the White Snake into an ordinary girl. Such errors have been criticized and corrected."

The decline of the shadow show and the revised repertoire imposed upon the surviving companies reveal the pace with which profound changes are being wrought in the 20th-century world. An art that originated before the birth of Christ has been affected by the social and political events of the past fifty years more drastically than during all preceding centuries combined. Thus, if the Museum's shadow figures of the Pig-Headed Companion and the White Snake Maiden were returned to China today they would probably be reduced to lamp-shade ornaments for Hong Kong tourists, as was the fate of many of their colleagues. By being taken out of their land of birth by Dr. Laufer, these shadow figures may prove to be two of the few survivors of the days in China when the frequent sound of a high violin and the murmur of excited voices meant that shadows were playing their magic in a courtyard.

Daily Guide Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 6 P.M.

The prickly acacia tree of semidesert regions in north and northeast Africa provides a diet for camels, despite its large thorns. In Kordofan an extract from its seeds is used in tanning leather for camel trappings. In several regions the gum of the tree is collected for export. The work is a principal industry of nomadic tribes.

;S, FROGS, FROGS— ND MORE FROGS

Y MARGARET J. BAUER

)AGE that it never rains but it night well apply to the deluge of recently descended upon the f Amphibians and Reptiles. A of 77,000 frogs and toads arrived ed down from the heavens, as be imagined, but by the more an freight. They were delivered fully crated 5-gallon milk cans, en unpacked, were found to con- 2,700 jars of frogs. In one day

VAMPED WITH FROGS
:, Assistant in the Division of Amphib- tiles, in the midst of crates containing ed with some 77,000 study-specimens he Museum from the Belgian Congo.

m received more frogs and toads is been able to amass through of collecting, buying, barter, and 'act, the number almost equals umber of reptiles and amphibians in the Museum's entire collection, s roughly estimated at 85,000

)d of frogs and toads was by no expected, nor does the Museum keep all of them. The collection d to Chicago Natural History y Dr. Victor Van Straelen, Direc- nstitut des Parcs Nationaux de lge, with the request that Dr. hmidt, Chief Curator of Zoology, report on them. It is agreed that im may keep a representative e species.

ge collection was the result of a rvey made by a group of Belgian)f the newest of the Belgian Congo rc *National de l'Upemba*, situated d the headwaters of the Congo in Belgian Congo. The park is s a wildlife refuge and area for tudy, much on the same order as -known Belgian Congo *Parc National Albert*, which extends over more than 80,000 square miles in the mountain and lake region of the sources of the Nile.

The leader of the expedition, M. G. F. de Witte, long known for his scientific exploration of the Congo and for his numerous publications about African reptiles and amphibians, has already published the report on the reptiles in a handsomely illustrated volume. Chief Curator Schmidt's report on the amphibians, in which Robert F. Inger, Curator of Amphibians and Reptiles, and Hyman Marx, Assistant, will co-operate, will complete the survey. Dr. Schmidt hopes that a contribution of real value to knowledge about the frogs of Africa may result from study of this very large series of specimens of single species, as it provides opportunites for exact description and evaluation of characters as well as other data that are not usually afforded in museum material. The Museum's own considerable African collections contain nothing from the southern Congo region.

Dr. Schmidt's own museum career began in 1916 with studies of the herpetology of the Belgian Congo. Curiously enough, the study of the present frog collection will also be one of the first major undertakings of Mr. Inger's career as Curator of Amphibians and Reptiles in Chicago Natural History Museum.

PRE-GLIMPSE OF THE ART OF THE 1960's AND ON

Boys and girls whose creative talent already indicates that they will be among America's artists, illustrators, and designers of future years will have an exhibit of their work in Stanley Field Hall of the Museum from May 1 to 31. A selection of about 55 pastel drawings, casein paintings, and watercolors made by children in the Junior School of the Art Institute of Chicago and the work of some older students will be shown. All of these students, both junior and advanced, receive part of their instruction at Chicago Natural History Museum, where they specialize in studies by which nature motifs are adapted to art and design in various forms. The classes are a joint undertaking of this Museum and the Art Institute, which furnishes the teaching staff from its faculty.

Two artists on the staff of the Museum, Gustaf Dalstrom, Department of Anthropology, and Margaret G. Bradbury, Department of Zoology, selected the work for exhibition from the year's total output of the classes. Mrs. C. S. Howlett, head of the Art Education Department of the Art Institute, and teachers of the classes assisted in arrangements for judging and display. The younger students range in age from 7 to 17 years; students in the more advanced classes are 18 years of age and older.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

A GUIDE TO THE WILD FLOWERING PLANTS OF THE CHICAGO REGION. By Floyd A. Swink. Rockrose Press, Inc., Chicago, 1953. Paperbound, xv+160 pages, 20 figures. $3.

Most wild-flower guides deal systematically with the plants of a state or larger part of a country, are presented in non-technical language, and are profusely illustrated. Unlike these models, *A Guide to the Wild Flowering Plants of the Chicago Region* is geographically limited to a semicircle beginning at the Wisconsin-Illinois state line that reaches around Chicago to the Michigan-Indiana state line, is purposely based on an artificial code-system for identification, and contains no illustrations of plants. This code-system was conceived by the author as a "quick and easy guide to the plants occurring spontaneously in the Chicago region when they are in flowering condition," and the "average nature lover" lacking technical training in botany is expected to learn it before attempting to identify his specimens.

Each code consists of six letters of the alphabet, "A" to "C" indicating the life form of the plant, "D" to "H" the type of flower, etc. Combinations of these letters according to the characters found in a specimen make up the code of a particular species. Having mastered the code, the reader can find the particular entry (code) in the alphabetical listings, where the scientific and common names of plants may be found together with pertinent data and comments. The index may be used for cross-referencing, as for instance in the case of redbud with 12 codes (beginning with AHINSX and ending with AHLPUX) or in the case of the genus Acer with 68 codes. The illustrations show important key characters used in the codes. A glossary explains the terms used.

The interested reader is referred to standard manuals for detailed description and illustrations of plants. Difficult groups such as grasses, sedges, and rushes have been omitted as have non-flowering conditions. The author, an ardent collector and field man, invented this code system in the hope of aiding those who do not wish to penetrate the "closed field" of technical botanical literature. "Average nature lovers" may quickly hurdle the six-letter codes and arrive promptly at the names of the plants they would like to know.

THEODOR JUST
Chief Curator of Botany

SMALL CLUES SOLVE 'CASE OF THE INCONSPICUOUS GIANT'

By EUGENE S. RICHARDSON, Jr.
CURATOR OF FOSSIL INVERTEBRATES

THE INVERTEBRATES are, on the whole, rather inconspicuous animals, probably because they live on the wrong side of the tracks and don't have backbones like all the respectable vertebrates that we commonly associate with. If you ask a friend to mention a lot of animal names, he'll undoubtedly run through cows, tigers, wombats, elephants, mice, and such familiar creatures before he'll shift gears and even think of mentioning the mosquitoes, clams, amoebas, earthworms, or shrimps that actually far outnumber them.

Thus it is likely to come as a surprise to find that in some times and places the

Figure 1. An unknown organ—is it plant or animal? Museum fossil-hunters found two of these one day and started on the trail of an inconspicuous giant.

invertebrates have included in their ranks animals larger than the contemporary vertebrates. Of course, this was the case in the early part of the Paleozoic era before there were any vertebrates at all. But the invertebrates won that round by default and we won't even mention it. Also, there are tales and shreds of evidence of the mysterious *Kraken* of today's oceans, a squid that may be larger than a whale. But we won't mention that either because we aren't very sure of it.

But another giant invertebrate has recently turned up in our own back yard, among the familiar fossil ferns and crab-like animals of the strip mines near Chicago. These strip mines, in Will and Grundy counties, are only about fifty miles from the heart of the city and have for years attracted not only Museum staff members but also hundreds of other collectors from near and far. The fossils lie in the heaps of clay, or spoil, removed from the mines when the coal was scooped out, and collecting fossils is simply a matter of walking around and picking them up. People have been collecting them from the strip mines since the early '20's, and from the banks of Mazon Creek, where the same bed is exposed along the stream, since 1857, almost a century.

In spite of the long and intense interest in these areas and in spite of the thousands of fossils that have been removed and examined, every collecting season yields some hitherto unknown fossil forms. Thus, during the summer of 1952, when I was collecting fossils with George Langford, Curator of Fossil Plants, we were not surprised to find two specimens that looked like something new (*see Figure 1*).

We tucked them into our collecting bags and brought them back to the Museum, where Curator Langford washed them and carefully cleaned off a small amount of mineral deposit. Then we examined them and tried to think what they could be. At first glance the pattern of triangular bosses reminded us of the leg-bases of ancient spider-like arachnids that we sometimes find in the spoil heaps. But these specimens were far bigger than any arachnids that we had ever encountered, and, more important, they lacked a right-left symmetry that arachnids must have. We remarked on the texture of the surface of the triangular bosses, closely resembling the texture of an arthropod shell.

If you examine the shell of a crayfish or crab with a magnifying glass, you can easily see the irregularly spaced pits, pores, and bumps that almost all arthropod shells have. But, again, all arthropods have a right-left symmetry. Although we were ready to admit that these might be arthropod specimens, we couldn't think of any Coal Age arthropod large enough to use these pieces and still have room for a matching piece on the other side to make up the symmetry. Neither could we recognize these pieces as resembling any known arthropod by itself.

At that point, Curator Langford brought out some specimens of seed-fern fruits from the same deposits. Although the new unknowns didn't look just like any of his fruit specimens, the resemblance was close enough in some respects that we decided that we had picked up some unknown plant parts.

Figure 2. The leg of an unknown giant animal, with duplicate of unknown organ joined to inner end.

So we agreed that they should be put in the fossil plant collection, in a drawer with other unknowns waiting for further information. They might well have stayed there for some time to come, for new information would have to be in the form of new and more complete specimens, as we could be sure that Curator Langford had not overlooked any published pictures of fossil plants that might resemble them.

NEW EVIDENCE FOUND

But they stayed tucked away for less than a year. In 1953, Mr. and Mrs. John McLuckie, of Coal City, were collecting fossils in the spoil heaps when, at the end of the day, Mrs. McLuckie picked up "one more for luck" and found what seemed to be a complete shrimp about six inches long, more than twice the size of any of the shrimp-like animals commonly found in the strip mine deposits (*see Figure 2*). Mrs. McLuckie very kindly allowed us to bring her specimen to the Museum to be photographed and studied, and in it we found the answer to the two specimens among the unknown plants.

The supposed shrimp had what seemed to be a perfectly good jointed abdomen with little legs projecting from each segment, but the front end didn't fit with any shrimp

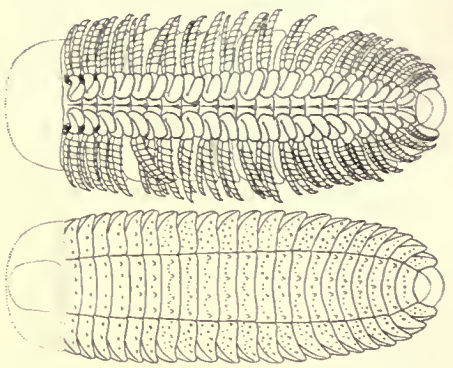


Figure 3. This is the newly identified animal itself, Arthropleura by name, as reconstructed from fragments found in the Saar Basin in Europe.

that ever lived. Rising like a comb from its back, where there should have been just a rounded armored thorax, was a duplicate of one of those unknown organs with the triangular bumps.

Mrs. McLuckie's "shrimp" thus brought the two unknown specimens out of the plant drawer again and into my hands, for the task of comparing them with other fossil invertebrates was within my province.

Examining the new large specimen under the microscope, I noted that the supposed legs projecting from the joints of the abdomen were actually spines attached to those joints. But since the specimen was clearly some kind of arthropod, with the typical surface texture and with a jointed armor, it became clear that the entire specimen was not an animal, but merely the leg of an animal. But what a tremendous animal it must have been, compared with

ary fossils from that locality! An with a leg six inches long must a body several feet long.

IRST AMERICAN SPECIMEN

he procedure of identifying fossils first of all, on looking at pictures in various journals. So I disap- to the Museum's fine research li- l soon found that our specimens n a large but primitive creature *thropleura*, never before found in nerica, though not uncommon in ne European coal basins.

unately, no complete specimen of *pleura* has ever been discovered, gh specimens of various pieces found so that Professor Waterlot, niversity of Lille in France, has to make a drawing of what it must ed like (*see Figure 3*).

our inconspicuous giant must about five feet long. Compared other invertebrates among which was an imposing monster, but it ing to find that it was also tre- y larger than the little vertebrates occasionally found in the spoil hose were less than a foot in length, the same Coal Age there were tebrates, approaching the length *pleura*, in other places.

e organ with the triangular bosses rofessor Waterlot, who has seen a y specimens, including some with gs, reports that it is an attachment hich holds the leg flexibly but the body.

GOURMETS THRIVE N DIET OF SNAILS

By AUSTIN L. RAND
CURATOR OF BIRDS

LARMED SNAIL withdraws its , succulent body into the protec- hard, coiled shell and pulls tight culum that covers the opening. the equivalent of the duke in his h the drawbridge up and the port- n, or the cottager with his doors ows barred. It has a measure of . But where there is an elaborate of protection for some desirable , it usually happens there is a ent for overcoming it in some at wants the food.

ail is only moderately safe. To course, the snail is "his oyster." ly in Latin countries it is a gour- ght. Dropped into boiling water, ew minutes, drenched with a butter d served in groups of six to eight plate, the snail can be tipped or t of its shell without trouble, or a e used to twitch it out of its shell

snails may be delicacies, eaten only on occasion by civilized man, to a few birds they are the staff of life. Naturally it is mostly in the tropics and the subtropics that snails are most numerous and grow to large size. In Florida the Everglade kite and the limpkin, eating nothing but snails, are limited in their distribution by that of the large snails on which they subsist. A few other birds in the Old World tropics—certain storks and one species of kingfisher—live largely on snails. One temperate-zone bird, a thrush of Europe, is a confirmed snail-eater.

Special techniques must be used to get snails out of their shells, and only a few birds have solved the problem. The availability of a supply of snails does not necessarily mean that birds will learn to eat them, for the Hawaiian Islands have an abundance of large land snails, but none of the Hawaiian birds, despite their many adaptations in their island environment, have "learned" to open snails.

SOME BIRDS ARE 'SPECIALISTS'

The birds that have "learned" to open snails belong to quite diversified groups. One is a kingfisher, one a thrush, one a relative of rails; two are storks, and several are kites. Obviously each evolved its specialized technique independently and became the snail specialist among its near relatives.

These birds didn't all solve the problem the same way either. Some evolved special physical structures for this, like the open-billed stork with nutcracker-like bill and the snail-kites with elongated slender hooked bills for "snail hooks." Others, without special physical equipment, utilized certain aspects of their environment to help them, like the kingfisher and the thrush that pound the snails on a favorite anvil and the limpkin that places a snail so the mud will hold it while it uses its bill like a pair of tweezers.

A fresh-water snail that may be as large as a hen's egg is one of the favorite foods of the open-billed storks of Africa and India. These birds simply crush the snail in their six-inch bills and swallow the flesh without the shell.

To separate the flesh from the crushed shell the open-bill sometimes at least crushes the shell in the water and, holding the body in its beak, shakes it and washes it until free of the shell, according to Sir Frederick Jackson of East Africa. The bill has a big gap in it, just back of the tip, which seems to make it easier to hold the snail, as the notches in a nutcracker help hold a nut. But there is some disagreement about this gap. Some observers claim that the gap is the result of wear, being caused by the continual cracking of snails; others that it is a natural condition, presumably evolved for this special job. More observations in the Old World tropics are needed to reconcile these two viewpoints.

Visiting Hours Extended for Summer Season

Effective May 1 and continuing through September 6 (Labor Day) visiting hours at the Museum are extended by one hour. The Museum will be open daily, including Sundays and holidays, from 9 A.M. to 6 P.M. At the end of this period, hours will revert to 9 A.M.–5 P.M.

The ruddy kingfisher of the Philippines, like the song thrush of Europe, also breaks open snails. But these birds do not have powerful enough bills to crush a snail. Rather, they hold the snails in their bills and pound the snails on rocks that they have found especially suitable for the purpose and to which they return time after time. A heap of empty broken snail shells accumulates around these favorite rocks, which could well be called anvils. Of course many an insect-eating bird beats its prey on the ground or on a perch to batter and subdue it. But the ruddy kingfisher has gone a bit further and selects a specially suitable stone and uses it repeatedly. They have become specialists.

Also without any special physical equipment, the limpkin of Florida lives exclusively on snails. It simply plucks the snails out of their shells. To do this the limpkin, a fowl-sized, rail-like bird with a four-inch slender bill, uses the mud to hold the snail in position for the operation. As Dr. Alexander Wetmore describes it, the limpkin picks up the snail in its bill and seats it in the mud with the opening up. Then like a pair of tweezers the mandibles are pushed down, one on each side of the operculum, and this protective cover is twitched off. Again the tweezer-like bill is pushed into the shell, this time into the snail's flesh and, with a flick, the shell, unbroken, is shaken off the body and the latter swallowed.

A bill with a much longer and more slender hook than that of most birds of prey is the special equipment with which Everglade kites of Florida get snails out of their shells. The Everglades kite and several of its close relatives are medium-sized hawks of the American tropics that subsist exclusively on snails. Their method is to pick up the snail in their talons, carry it to a favorite perch, and hold it there in their feet with the opening upward until the snail, thinking perhaps to effect an escape, opens the operculum cover and pushes out its "foot." This is what the hawk has been waiting for. The long "snail hook" is driven into the body of the snail, the flesh is pulled out, and the empty, unbroken shell discarded. Some observers have said the snail comes out in one piece; others that it is torn out piecemeal. Perhaps both opinions are right, the birds doing one or the other depending on varying conditions, such as the tenacity of the snail.

DALLWIG TO DRAMATIZE ROMANCE OF DIAMONDS

"The Romantic Story of the Diamond" will be presented on the first four Sundays in May by Paul G. Dallwig, the Layman Lecturer (*Mr. Dallwig will not appear on May 30, Memorial Day*). The programs in May will conclude the 1954 season of Layman Lectures, but Mr. Dallwig is expected to resume his Sunday-afternoon presentations next January.

The history of diamonds and the legends about them will be related by Mr. Dallwig in his lectures on May 2, 9, 16, and 23, which will include a three-act dramatization. He will tell the story of how diamonds were first found and of the present great diamond industry. Of special interest are the tales of intrigue, greed, and murder that dot the history of the successive ownership of the world's most famous diamonds. For the last half-hour the audience will be taken to the Museum's Hall of Gems and Jewels (H. N. Higinbotham Hall).

The Sunday lectures begin at 2 P.M. Museum Members are admitted upon presentation of their membership cards. Others must make reservations in advance by mail or telephone (WAbash 2-9410).

STAFF NOTES

Miss Miriam Wood, Chief of the Raymond Foundation, was a "resource leader" at the Adult Education Conference held from April 9 to 10 in De Kalb, Illinois, under the sponsorship of the Northern Illinois State Teachers College. Her subject was "Museums and Adult Education Programs." . . . **Loren P. Woods,** Curator of Fishes, was a guest-member on April 20 of the panel on the television program "Of Many Things" (station WBKB, ABC, Channel 7), a program conducted by Dr. Bergen Evans of the faculty of Northwestern University . . . . **Donald Collier,** Curator of South American Archaeology and Ethnology, was a discussion leader in a conference on "Museums and Anthropology" held at the University Museum in Philadelphia on April 23. The conference was sponsored by the American Anthropological Association and the Wenner-Gren Foundation . . . . **George I. Quimby,** Curator of Exhibits in Anthropology, was elected to the executive committee of the Central States Anthropological Society at its annual meeting at Purdue University. During the latter part of April he made an archaeological field trip to Mississippi and Louisiana . . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently lectured before the Kankakee Cultivators, Friends of Our Native Landscape, Wildwood Garden Club of Edgebrook, and Sauganash Garden Club on subjects ranging from wild flowers and conservation to his explorations in the "lost world" of Venezuela . . . **Henry S. Dybas,** Associate Curator of Insects, presented a paper on "Evolution of Bat Flies" at a recent meeting in Omaha of the North Central Branch of the Entomological Society of America.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received recently:

Department of Anthropology:

From: Mrs. F. W. Geisler, Burbank, Calif.—spurs for cock fighting, Sumatra; Wenner-Gren Foundation for Anthropological Research, New York—wooden churinga, Central Australia

Department of Botany:

From: Dr. Leandro Aristeguieta, Caracas, Venezuela—7 plants and phanerogams; Holly R. Bennett, Chicago—172 grasses, Rosebud County, Montana, and 154 miscellaneous phanerogams, Indiana and northern Illinois; Bill Bauer, Imperial, Mo.—plant; Raphael Romero Caetaneda, Bogotá, Colombia—*Aragoa kogiorum*; Prof. B. Kaspiew, Adelaide, Australia—5 plants; Kendall Laughlin, Imperial, Mo.—3 plants; E. J. Palmer, Webb City, Mo.—325 plants; Dr. R. E. Schultes, Cambridge, Mass.—40 plants, Colombia; Dr. Earl E. Sherff, Chicago—393 phanerogams, 122 Sophora, Hawaii; Dr. John W. Thieret, Chicago—66 phanerogams, Utah; Dr. C. M. Palmer, Cincinnati—112 algae, Indiana; Dr. C. C. Palmiter, Richland, Wash.—49 algae; Dr. R. F. Palumbo, Seattle, Wash.—42 algae, Marshall Islands; Dr. J. Rousseau, Montreal—35 algae, northern Quebec; Dr. P. O. Schallert, Altamonte Springs, Fla.—63 cryptogams, Hawaii and Florida; Emil Sella, Chicago—3 cryptogams; Dr. J. D. Soriano, Quezon City, Philippines—312 algae

Department of Zoology:

From: Dr. James Beer, St. Paul—2 bats, Mexico; Dr. Adrey E. Borell, Oklahoma City—3 bats in alcohol, Texas; John M. Campbell, Albuquerque, N.M.—17 birdskins, Philippines; Chicago Zoological Society, Brookfield, Ill.—birdskin, 2 bird skeletons; Department of Agriculture, Sandakan, North Borneo—7 lots of fishes; D. S. Erdman, Mayaguez, Puerto Rico—19 lots of fishes, Dominican Republic and Puerto Rico; Dr. Henry Field, Coconut Grove, Fla.—310 beetles, butterflies, moths, flies, bugs, Egypt, Iran, and Iraq; Dr. R. L. Fleming, Uttar Pradesh, India—461 birdskins, Nepal; R. Wheeler Haines, Sheffield, England—hedgehog; Harry Hoogstraal, Cairo, Egypt—165 mammals, 2 frogs, 48 lizards, 24 snakes, 12 turtles, Egypt and Turkey; Dr. Marshall Laird, Suva, Fiji—2 frogs, Ellice Islands; Herbert W. Levi, Wausau, Wis.—lizard; Dr. Harold Trapido, Panama—10 tadpoles; Mr. and Mrs. Loren P. Woods, Homewood, Ill.—17 lots of fishes; N. L. H. Krauss, Honolulu—snake (*Ninia maculata*), Costa Rica

Library:

From: Bruce A. Hertig, Dayton, Ohio

PAINTINGS OF INDIANS IN MUSEUM BOOKLET

The 35 paintings of Indians and western scenes in Chicago Natural History Museum's collection of the work of George Catlin, American artist of the 1830's, are reproduced in a booklet just published by the Museum Press. The little volume, under the title *Indians of the Western Frontier,* contains a brief text by George I. Quimby, Curator of Exhibits in Anthropology, outlining the history of the artist and his work and telling of the acquisition of the paintings by the Museum. Each of the reproductions is accompanied by an identifying caption summarizing what is known of the subject. Some of the paintings are of famous chieftains and warriors. Among the tribes represented are the Dakotas, Blackfoot, Crow, Sioux, Sauk and Fox. A few of the paintings are of bison. The collection was displayed in a special exhibit in Stanley Field Hall during April. The booklet is on sale at the Museum for 50 cents (by mail order, 6 cents additional for postage).

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Geology Memoirs, Vol. 3, Nos. 3 and 4. *The Vertebrate Fauna of the Selma Formation of Alabama. Part III, The Turtles of the Family Protostegidae. Part IV, The Turtles of the Family Toxochelyidae.* By Rainer Zangerl. 248 pages. $6.

Fieldiana: Geology, Vol. 10, No. 15. *A New and Primitive Early Oligocene Horse from Trans-Pecos Texas.* By Paul O. McGrew. 8 pages. $.15

Fieldiana: Zoology, Vol. 34, No. 11. *A New Fish from North Borneo, Genus Tetraodon.* By Robert F. Inger. 4 pages. $.15

Fieldiana: Zoology, Vol. 34, No. 12. *A Visit to Karewa Island, Home of the Tuatara.* By Karl P. Schmidt. 12 pages. $.25

Fieldiana: Zoology, Vol. 34, No. 13. *Hemprich's Coral Snake, Micrurus hemprichi.* By Karl P. Schmidt. 8 pages. $.15

Fieldiana: Zoology, Vol. 34, No. 14. *The Amazonian Coral Snake Micrurus spixi.* By Karl P. Schmidt. 12 pages. $.25

Fieldiana: Zoology, Vol. 34, No. 15. *A New Frog from Panama Dendrobates galindoi.* By Harold Trapido. 8 pages. $.20

Fieldiana: Zoology, Vol. 34, No. 16. *The Elapid Genus of Snakes Walterinnesia.* By Hymen Marx. 8 pages. $.20

Fieldiana: Zoology, Vol. 34, No. 17. *A New Worm Snake from Colombia, Genus Anomalepis.* By Hymen Marx. 4 pages. $.15

Fieldiana: Zoology Vol. 35, No. 1. *Behavior of the Lizard Corythophanes Cristatus.* By D. Dwight Davis. 18 pages. $.30

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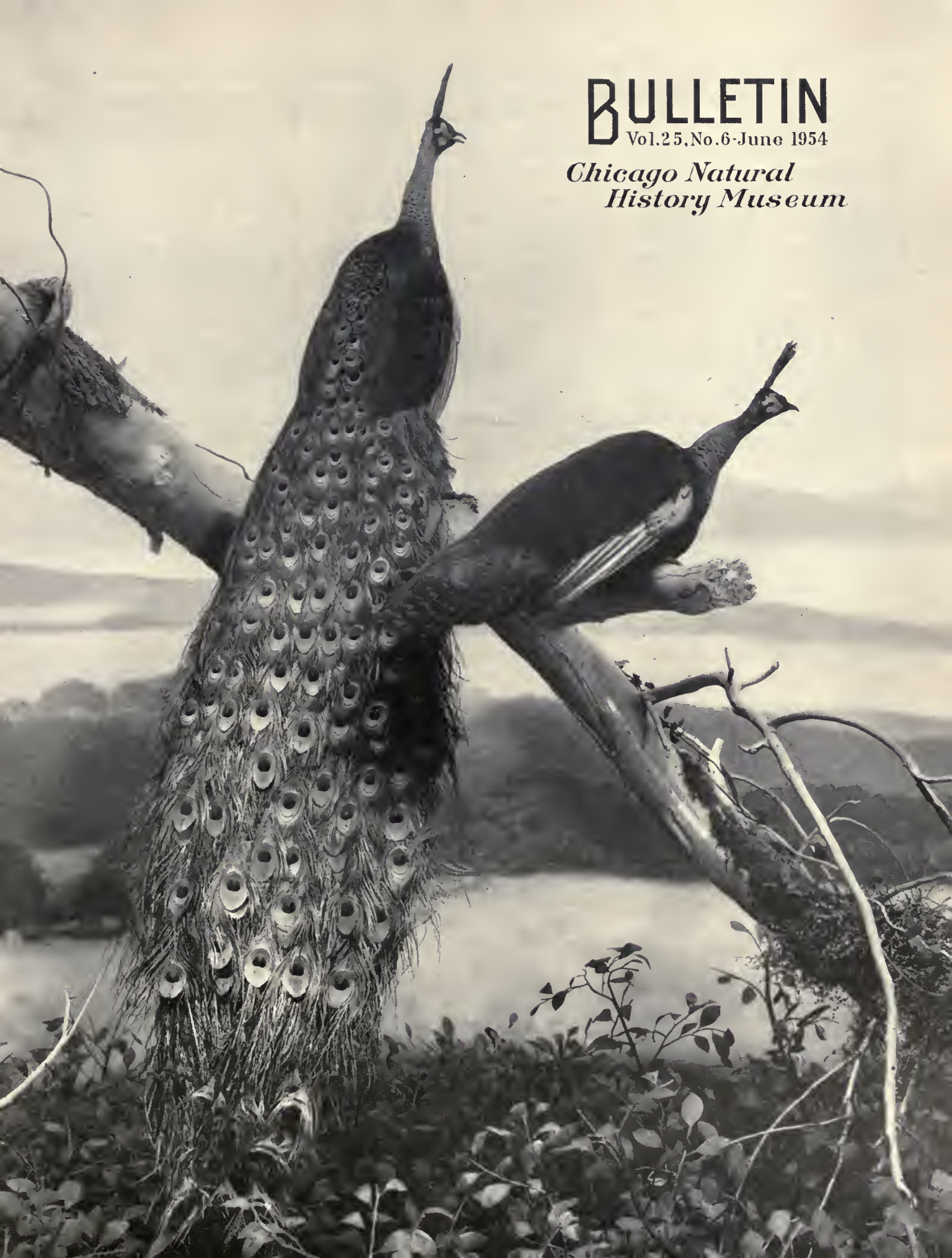

BULLETIN

Vol. 25, No. 6 - June 1954

Chicago Natural History Museum

Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

LIBRARY PROJECT REVEALS RARE ORIENTAL TREASURES

THE IMMENSE TASK of preparing for classification, by transcription, the wealth of Oriental books left to the Museum by Dr. Berthold Laufer, former Chief Curator of Anthropology, has been started by Dr. Hoshien Tchen, recently appointed to the Museum staff as technical advisor. These books, collected by Dr. Laufer during his trips to China and Tibet, now fill twenty-eight large cartons and have had to remain in storage until someone with a knowledge of Oriental languages and books could be assigned to assist the librarians in preparing them for classification.

Dr. Tchen's responsibility is to prepare the collection for cataloguing and classification under the two systems of romanization that have been adopted as standard among English-speaking people. He will use the Wade-Giles system of writing the sounds for the Chinese characters and the modified Hepburn system for the Japanese characters.

Dr. Tchen is admirably qualified for this project. In 1922–24 he was a professor at the National College of Political Science in Peiping, China. He later served as advisor of the National Palace Museum in Peiping and director both of the Department of Justice and of the Department of Education of Kiangsu Province, China. In 1932 he was the Chinese delegate to the session of the Cultural Co-operation Committee of the League of Nations in Geneva, Switzerland. More recently he served as executive director of the board of The World Book Company, Ltd., Shanghai, and as a member of the Chinese committee for UNESCO, Nanking. In addition, Dr. Tchen has been a collector of Oriental books for many years and has gained a wide knowledge of many rare and valuable volumes known only to bibliophiles.

CONDEMNED RARITIES FOUND

So far, Dr. Tchen has opened only seven of the twenty-eight cartons containing the Laufer collection. But in those cartons alone he has been delighted to discover copies of books he thought had been destroyed during the Communist book-burnings in China. Books on ancient classics, antiquities, science, art, and history have been unearthed from the unprepossessing confines of the cardboard cases. In some instances the books are works of art—all the characters are made from hand-carved wood blocks and the illustrations are beautiful examples of Chinese line-drawings.

The majority of volumes are exceedingly rare, published 100 to 300 years ago. Many of the books were privately printed and, in some cases, only a limited number of 50 to 100 copies were issued. It has been found that among the volumes in this collection are valuable historic works not included in the Orientalia collection of the Library of Congress.

A COMPLEX TASK

Despite the fact that Dr. Tchen knows so much about the Chinese language and Chinese books, the task of transcribing Chinese and Japanese characters to the English language is a complicated and difficult one because romanization of an author's name or the title of a book written in characters is based on a pronunciation of that name or title. This pronunciation may vary from person to person. Although the Orientalia Processing Committee of the Library of Congress is studying the problems of the cataloguing of Chinese, Japanese, and Korean publications, standard rules for this procedure have not yet been definitely formulated. Mrs. Meta P. Howell, Librarian, Mrs. M. Eileen Rocourt, Classifier, Dr. Tchen, and M. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, have had frequent discussions to resolve the ever-recurring problems that classifying and cataloguing of books in the Oriental languages inevitably bring.

Dr. Tchen is simultaneously working on new selected acquisitions in archaeology and ethnology published in the Far Eastern languages and currently received in the Museum Library. The Laufer collection, together with many other rare volumes of Orientalia, will be housed in a new room now being prepared for this purpose. This collection, with the many volumes of Orientalia already classified among the Library's holdings, promises to be an unusually comprehensive and important Oriental library.

THIS MONTH'S COVER

June is the bride's month, but the groom is the more resplendent of the pair of exotic peafowl symbolizing the season on our cover. This phenomenon of the male's dominance in beauty, commonplace in the animal kingdom outside the human race, is perhaps more accentuated in the peacock with its majestic train of colorful feathers than in any other creature. The birds in the picture are the rare and little-known green peafowl and come from Indochina, scene of current strife. This species is found also in Burma, Siam, and the Malay Peninsula. The specimens, collected on an expedition to Indochina by the late Dr. Wilfred H. Osgood, former Chief Curator of Zoology, form a habitat group in Hall 20 of the Museum (taxidermy by John W. Moyer, background by the late Arthur G. Rueckert, Staff Artist).

PAUL DALLWIG COMPLETES HIS 14th LECTURE SEASON

With his four appearances on the lecture platform of the Museum in May, Paul G. Dallwig, the Layman Lecturer, closed his fourteenth season of dramatizations of scientific subjects for Sunday-afternoon audiences. The season ended with his 402nd lecture. He will return next January with another series of programs. During the five months of his lectures this year his audiences totaled 4,043. For all fourteen seasons his listeners have aggregated 49,243 persons.

The Dallwig lectures—and Mr. Dallwig himself—are truly unique. Mr. Dallwig is a business and professional man whose own deep interest in natural science led him to the belief that a great many other people would find scientific subjects fascinating if they were presented vividly and dramatically in the language of the layman. His theory has been proved correct by the enthusiastic reponse the public has given to his lectures. He devotes many hours to preparation of each lecture and adds his own distinctive touches to his dramatic expositions of science.

PRIZE-WINNING GEMS AND JEWELRY ON DISPLAY JUNE 1-30

A TREASURE of prize-winning gems and jewelry worthy of a king's ransom will be shown in a special exhibit in Stanley Field Hall of the Museum from June 1 through June 30. All of the examples of the lapidarist's art in this display are the creations of amateur gem and jewelry craftsmen from all parts of Chicago and suburbs. Each is a prize winner in the Chicago Lapidary Club's Fourth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition.

This year's show attracted unusually strong competition from all parts of the city and suburbs. Typical of some of the outstanding exhibits is a collection of 375 cabochons cut from 160 different semi-precious gem materials. Another exhibit is an assortment of beautiful spheres. Included in the show also are a sparkling sunstone from Norway; banded agate from Brazil; jade from Burma, New Zealand, and Wyoming; turquoise from Arizona and Nevada; and many other kinds of gem material from Washington, Oregon, California, Utah, and dozens of other localities throughout the United States.

It takes hours of time, patience, and skill to cut and polish a beautiful cabochon from a piece of rough gem material that to many laymen looks like nothing but an ordinary rock. The surprising thing about the work

PRIZE WINNERS DISPLAY CREATIONS FOR GEM AND JEWELRY SHOW, JUNE 1—30

Alvin E. Ericson (left), winner of Presidents' Trophy awarded by Chicago Lapidary Club for outstanding craftsmanship in faceting gems. J. Lester Cunningham (center) with the Dalzell Trophy awarded to his collection of Lake Superior agate cabochons as best exhibit in show. Florence Swan (right) with two of her prize-winning jewelry displays. Like many other contestants, she designs the metal work as well as preparing gems.

The competitors are from all walks of life and include housewives, engineers, secretaries, salesmen, school teachers, and business executives. Most of these amateur craftsmen learned gem-cutting and jewelry-making in the various classes offered in field houses throughout the small parks of the Chicago Park District.

NOVICES AND OLD HANDS

Competition was divided into two classifications—novice and advanced. Those in the novice classification have had up to two years' experience and those in the advanced classification have been engaged in lapidary work for longer periods.

Entries in both the novice and advanced classifications competed in the following craft divisions: (1) individual gems, cabochon; (2) individual gems, faceted; (3) specific gem collections; (4) general gem collections; (5) individual jewelry; (6) jewelry sets; (7) jewelry collections; (8) enameled jewelry; (9) special pieces; (10) polished-slab collections; (11) polished-specimen collections.

SEVENTY-SIX AWARDS

In all, 57 ribbons, 8 medals, and 11 trophies were awarded to the winners. The Dalzell Award for "Best of Show" was won by J. Lester Cunningham for his collection of 275 Lake Superior agate cabochons. The Presidents' Award, presented for outstanding lapidary craftsmanship, was won by Alvin E. Ericson for his large emerald-cut blue topaz. A Museum staff member, Miss Ruth Johnson, of the Division of Birds, won first and third prize for her entries in the novice enameled-jewelry division.

Gem material from all over the world is used by these "rockhounds" who transform rough material into spectacular jewels. There are: malachite from the Belgian Congo; opal from Australia; tiger-eye from Africa; display of faceted gems cut from a wide variety of material and an exceptional display of jewelry of every type and variety.

DESIGNS ARE WIDELY VARIED

Many of the rockhounds are also expert metal craftsmen, as familiar with working in gold as they are with sterling silver and copper. The majority have had little or no formal training in design, but their jewelry creations show remarkable aptitude in the traditional and modern styles as well as in ultramodern motifs. Almost every one of the competitors who won and many who did not win in this year's competition are already planning entries for next year's show.

Jack Best, chairman of the exhibition committee for this year's show, reports that the Chicago Lapidary Club is already busy with plans for new features next year.

of these amateur craftsmen is the fact that many of them have had only a few years' experience in the hobby that to them becomes more fascinating with each new gem and jewelry piece completed.

Races of Man Sculptures In New Photographs

John Bayalis and Homer V. Holdren, Museum Staff Photographers, have added approximately 125 new negatives of the Malvina Hoffman sculptures of the races of mankind (Chauncey Keep Memorial Hall—Hall 3) to the already voluminous files of negatives in the Division of Photography. The new negatives were made to replace several small negatives with larger ones, to replace negatives of plaster models with those of bronze sculptures, and to feature views of the sculptures that had not been photographed before. A revised list of photographs of sculptures in the Hall of Man is being prepared.

Foreign Museum Officials Here

Officials of two foreign museums were visitors at Chicago Natural History Museum last month to observe operating methods in use here. The visitors were Nevati Dolunay, director of the Archaeology Museum in Ankara, Turkey, and Professor Yasushi Hoshino, of the Tokyo Institute of Technology and the Museum of Japan.

'From Huts to Palaces' . . .

ARCHAEOLOGISTS RESUME DIG IN SOUTHWEST

"Southwest Dig" has long been an important summer activity of the Museum. Late last month, with the departure for the field of Dr. John B. Rinaldo, Assistant Curator of Archaeology, the twentieth Southwest Archaeological Expedition (eleventh in western New Mexico) began operations. Dr. Paul S. Martin, Chief Curator of Anthropology, will leave early in June to take charge. Past accomplishments of the expedition are reviewed and current aims outlined in the following article.

By PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

FOR TEN SEASONS we have been on the trail of the Mogollon Indians of western New Mexico, trying as best we could to piece together their history. From our digging on ten Southwest Archaeological Expeditions and from subsequent analyses we have found that during a period of roughly 4,000 years (from 2500 B.C. to about A.D. 1300) these Indians "pulled themselves up by their boot straps" and achieved a moderately successful civilization.

When we first catch a glimpse of these people (2500 B.C.), they are living in skin tents or small cellar-like houses, called pit-houses, and are eking out an existence by gathering wild edible plants, by hunting, and by farming. Corn was a new thing in those days and did not yield much food per plant because the ears were only an inch or so long.

PROGRESS IN MANY DIRECTIONS

Centuries passed and the Mogollon Indians, in response, perhaps, to some universal human urge, "let no grass grow beneath *their* feet." They continually strove to improve their lot, and their progress was easy for us to spot as we burrowed around and through their abandoned houses and garbage dumps. We found, for example, that at A.D. 500 their houses, although still glorified pits, were better built and adapted to the climate; their crops consisted not only of corn but also of beans and squashes —and the corn-ears were larger and juicier; their pottery was now of good quality, and some of it was painted with a bold hand and imagination; their tools of stone, bone, and wood were fitted to the tasks at hand; special and larger pit-houses were set aside for ritual and worship; and belief in an afterlife existed.

By the time 700 more years had passed, the Mogollon people had moved from their "huts" (pit-houses) into what we call pueblos. A pueblo is a kind of honeycomb, a group of contiguous rooms—perhaps 20 to 50 in number—that is built of stone and is one to four stories in height.

The pueblo that we excavated last summer consisted of about 30 rooms and was mostly only one story high. Although the Mogollon Indians may not have been aware of their "emerging evolution" or of the vast improvement in their living conditions, *we* consider their pueblos as palaces when compared to pit-houses.

At any rate, by the time of the final and unsuccessful European Crusades (about A.D. 1250) our Indians had achieved a solid record of progress and, so far as we know, had no desire to conquer, to be conquered, or to proselytize. (A brief description of their accomplishments was published in the BULLETIN for November, 1953, and a complete account of the 1953 Southwest Archaeological Expedition now awaits publication.)

MIGRATION TO BE TRACED

If the Mogollon culture had had time to stretch and grow and develop without hindrance, there is a probability that it might have evolved a truly advanced civilization. But this was not to be. For some mysterious reason, as yet imperfectly understood, the Mogollon Indians abandoned the land they had dwelt in for more than 4,000 years. Where they went and why is not known.

But we are on the trail and have reason for believing some of them may have moved northward and some westward into what is now Arizona. We already have some clues to this migration. When we are more certain about where they went, we shall move our camp headquarters, perhaps in the next year or so, and continue our archaeological researches in the new region.

We have three projects planned for the 1954 Southwest Archaeological Expedition. The first is to dig the plazas and ceremonial room (kiva) of Higgins Flat Pueblo, part of which we excavated last summer; the second is to dig a large village-pueblo that we think was one of the last to have been occupied in the area; and the third is to investigate a village that may have been the earliest one in the area. This last project is especially important because, although we have found the tools and crops (in caves and arroyos) that are dated at about 2500 B.C., we have never found the villages in which the people of that era lived.

This is an ambitious program. We may not be able to fulfill all of it, but we shall do all we can.

"Science . . . is a natural and integral part of man's whole life, an activity which, at base, is a blend of logic, intuition, art and belief. It has been refined into an instrument of great beauty and precision by the few, but this science of the few is merely the distillation of the experience of the many. As a natural social activity of man, science belongs to all men."

—*Warren Weaver*

STAFF NOTES

Dr. B. E. Dahlgren, Curator Emeritus of Botany, has returned to the Museum from his botanical expedition to Cuba . . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently discussed his expedition to the "lost world" of Venezuela before the Biltmore Garden Club and Chicago Ornithological Society . . . . **Bryan Patterson,** Curator of Fossil Mammals, has been awarded a John Simon Guggenheim Memorial Foundation fellowship for continuation of research in his field . . . . **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, and **Preparator William D. Turnbull** have returned from a field trip to the vicinity of Mecca, Indiana, with a carload of black shale to be studied for its fossil content . . . . **Miss Miriam Wood,** Chief of the Raymond Foundation, represented the Museum at the meetings of the American Association of Museums in Santa Barbara, California, where she presided at the sessions of the Children's Museums Section . . . **M. Kenneth Starr,** Curator of Asiatic Archaeology and Ethnology, is making a tour of museums in the east to study Oriental collections and exhibition techniques . . . . **Miss Elaine Bluhm,** Assistant in Archaeology, recently talked on her excavations in the Chicago area before the Anthropology Club of the University of Illinois in Urbana . . . . **Donald Collier,** Curator of South American Archaeology and Ethnology, and **George I. Quimby,** Curator of North American Archaeology and Ethnology, attended the meetings of the Society for American Archaeology in Albany, New York, last month. Curator Quimby was chairman of the session on midwestern archaeology . . . . **Dr. Karl P. Schmidt,** Chief Curator of Zoology, lectured before the Kumlien Club of Madison, Wisconsin, on natural history and conservation in Palestine . . . . **Loren P. Woods,** Curator of Fishes, **Miss Margaret G. Bradbury,** Artist in Zoology, and **Miss Pearl Sonoda,** of the Division of Fishes, attended the meeting in Monmouth, Illinois, of the Illinois Academy of Science. Curator Woods and Miss Bradbury presented papers on ichthyological subjects.

Entomologist on Field Trip

Rupert L. Wenzel, Curator of Insects, will leave on a trip of six to eight weeks to the West Coast on June 1. His main purpose is to study types and other specimens of histerid beetles in the collections of western universities and museums, particularly those of the California Academy of Sciences in San Francisco. En route he will collect histerid beetles and other insects, especially the shore-dwelling coastal species, the predators of beetle pests of pines, and the inhabitants of mammal burrows.

TESTS INDICATE PLANT SEEDS MAY LIVE FOR CENTURIES

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

RECORDS of exceptionally long life in living things, including redwood trees and confirmed alcoholics, have always attracted much attention. The longevity of seeds is a subject about which have appeared many reports, some authentic, some contradictory, and some completely false. One of the most common and persistent false reports concerns the germination and growth of mummy wheat from Egypt. No authenticated record of the germination of wheat taken from Egyptian tombs is available. Indeed, a number of observations indicate the complete loss of germinability of such wheat and equally old barley.

Attempts have been made to germinate ancient grains but none has ever been successful. For example, about fifty years ago at the Royal Botanic Gardens in Kew, an experiment was run with some grain from a model granary found in a tomb of the 19th dynasty. Samples were tested under various conditions, but after several months all the grain had disintegrated. Another experiment with mummy wheat from a sarcophagus of the Grecian epoch in Old Memphis proved completely unsuccessful in spite of precautions taken and the various conditions for germination provided. Examination of the internal structure of such mummy grains has shown the embryo to be dark brown and greatly shriveled, with little of its structure visible.

Several explanations have been offered for the frequent and popular belief in the germination of grains from Egyptian tombs. Recently harvested wheat has been packed into ancient coffins and sent to England. When such grains were tested for germination, of course they gave positive results. Some Egyptian businessmen have substituted fresh wheat for genuinely ancient grains and have sold such wheat to tourists who, upon return to their homes, plant and grow in their gardens "genuine mummy wheat from Egypt." Actually, cereals seem to be ill-adapted to a long period of seed dormancy, so ill-adapted, in fact, that the germination of 25-year-old wheat has been called exceptional, although in one case wheat stored for 32 years under dry conditions showed 69 per cent germination.

LONGEVITY RECORDS

Let us now examine some authentic records of longevity in seeds. In 1856, seeds of more than 600 different species were sent from Kew to Australia's then newly founded University of Melbourne. The seeds were intended for the university garden, but, upon their arrival, the garden was not ready. So they were set aside and replaced later with fresh material. The original 1856 shipment found its way into a dry, airy, dark, and vermin-free cupboard where it remained until its rediscovery in 1906.

SACRED LOTUS

The record for long life in seeds is held by those of this species, Nelumbo nucifera, reproduced here from Blanco's folio "Flora de Filipinas" (1878-80).

To this set of seeds were added others from various sources including dated herbarium specimens and seed collections. In all, there was ample material for about 3,000 germination tests. Of the 1,400 species and varieties of old seeds tested, the experimenter, Dr. A. J. Ewart, found that 46 were still viable after fifty years of storage. These were mostly leguminous seeds, but others were from the mallow, linden, spurge, mint, and iris families. The oldest seeds that germinated were those of two Australian legumes (*Goodia lotifolia* and *Hovea linearis*), both of which had been stored for 105 years.

The longevity record of 105 years obtained in Ewart's experiment was surpassed by the germination in 1934 of two seeds of a legume, one of the cassias (*Cassia multijuga*), which had been collected 158 years before. The experiment utilized, among others, some old seeds found in a storage room of a Paris museum.

At Kew about 20 years ago germination tests were run on seeds that had been collected in 1842 and 1851 and had been kept in loosely corked bottles. The age record for this experiment was held by the seeds of kidney vetch (*Anthyllis vulneraria*) and a clover (*Trifolium striatum*), both legumes, which germinated when 90 years old. Seeds of three species of the 1851 collection were sown in 1951. Those of red clover (*Trifolium pratense*) and bird's-foot trefoil (*Lotus uliginosus*), other legumes, showed a small per-cent germination at the age of 100 years.

During the fire in the British Museum in September, 1940, seeds of silk-tree (*Albizzia julibrissin*), still another legume, collected in China in 1793, became moistened. About one month later it was discovered that three of these seeds had germinated after a dormant period of 147 years.

SACRED LOTUS TOPS LIST

There seems to be little doubt that the record for the retention of viability by seeds is held by those of the sacred lotus (*Nelumbo nucifera*). Late in the 17th century (exact date apparently unknown) Sir Hans Sloane collected specimens of this species, and his collection was eventually acquired by the British Museum. Between 1843 and 1855 Robert Brown, the first Keeper of Botany at the British Museum, successfully germinated twelve seeds (actually fruits) from the Sloane material. At this time, the seeds were known to be at least 150 years old.

In 1926 another experiment with some Sloane seeds was quite unsuccessful, most of the seeds examined showing traces of mold. Early during World War II a further attempt was made to germinate a seed from this collection, then about 250 years old. This time the single seed used germinated within a short time and grew rapidly.

Approximately 250 years, then, is the longest record of longevity in a case about which the details are fairly well known. Perhaps far surpassing this record, however, are the ages of various sacred lotus seeds that have been shown to be still viable after apparently long periods of burial. Near the village of Liu-chia-tung in Manchuria is a naturally drained lake bed. One and one-half to two feet below the present surface of the soil is a layer of peat that is one foot to one and one-half feet deep. Numerous lotus seeds are found in the upper portion of the peat layer. It is the age of

these still viable seeds that has been the object of a great amount of speculation and study.

Since the sacred lotus grows in water, the seeds found in the peat layer must have been shed before the lake dried up. After the formation of the layer of peat on the bottom of the lake and the accumulation of many lotus seeds in this layer, the lake was somehow drained and about two feet of windblown dust from the Gobi Desert was then deposited over the peat. The Pulantien River has cut a valley about 40 feet deep through the lake bed into the underlying bed rock, thus exposing the peat layer high on the valley sides. In 1923 Dr. Ichiro Ohga, a Japanese botanist, published a paper wherein he estimated the age of the seeds to be perhaps as great as 400 years. Dr. Ohga presented a number of these seeds to the British Museum (some plants raised from these seeds flowered at Kew in 1933).

GROWN AT THIS MUSEUM

In our own Chicago Natural History Museum botanical laboratories a lotus seed, apparently from the same source, germinated in 1938 and grew rapidly. The plant was then transferred to Garfield Park Conservatory where it flowered about a year later. Unfortunately, it has since died. In 1951 more lotus seeds from the Manchurian lake bed germinated in Washington.

The original estimate of the age of these seeds has increased in a spectacular manner, for Dr. Seido Endo, geologist at Tohuko University in Japan, believes their age to be 50,000 years, the presumed age of the peat deposit in which they are found. However, radio-carbon dating of a few seeds by Dr. Willard F. Libby of the University of Chicago puts their age at from 830 to 1,250 years—doubtless a more reliable figure. Nevertheless, it is apparent that the question of their age is as yet unsettled, but there seems to be little doubt that the seeds are very old. The seeds from the peat differ in size, shape, and color from the seeds of the modern lotus. These differences may well be due to evolutionary change over a great lapse of time.

In January of this year, Dr. Libby reported the radio-carbon dating of wood from a canoe found twenty feet below the ground near Tokyo. The age of the wood, estimated at about 3,100 years, may perhaps be the age of three viable lotus seeds found associated with the canoe. Maybe someday the title of the world's oldest living things will be held by the seeds of the sacred lotus.

The long life of certain seeds would seem to be an illustration of anabiosis—the apparent suspension of life processes—in higher plants. It is difficult to imagine how, in cases of extreme anabiosis, the metabolic processes characteristic of life can proceed at all. One is reminded of the fact that certain micro-organisms can withstand temperatures as low as 269° below zero Centigrade, a temperature at which these processes certainly halt. Similarly, it is hard to visualize that a balance between the continuous life processes of building-up and tearing-down has been maintained for perhaps 1,000 or more years in the case of the sacred lotus seeds. Such stability of biological materials would seem to result only from a complete cessation of life activities. These are resumed rapidly when conditions become favorable.

From an economic standpoint, the percentage of germination of stored seeds is a figure of more significance than the oldest recorded age for still viable seeds. The major interest, so far as many economic plants are concerned, is in the maximum period of time that seeds may be stored and yet retain a high percentage of germination. It should be pointed out that optimal storage conditions are not yet known for any type of seed. Experimentation has indicated, however, that for many seeds these include (1) low temperature, (2) absence of oxygen, and (3) various degrees of dryness. It is quite probable that these are effective because any one of them results in checking respiration and other chemical reactions, thus preventing changes in the seeds.

A good example of the effectiveness of these conditions in prolonging viability is seen in work done with sugar-cane seeds. When stored in open air, these seeds degenerate rapidly, and consequently shipping them from one area to another cannot be done with confidence. Experimentation has shown that their life can be lengthened materially by taking the seeds from air-dry heads, placing them in cans with a suitable drying agent, displacing the air with carbon dioxide, sealing, and storing at the freezing point.

Similarly the seeds of the rubber plant retain their viability only a short time in open air. This rapid loss of life has been a stumbling block to the extension of rubber plantations. In this case, viability may be prolonged markedly by storage of the seeds in 40 to 45 per cent carbon dioxide. The life span of the seeds of a number of vegetables, including lettuce, cauliflower, onion, tomato, and carrot, may be increased by controlled conditions of storage, particularly low temperature and reduction in moisture content.

The problem of the loss of viability of seeds has yet to be solved, although several hypotheses have been advanced to account for it. One of these suggests that such loss is due to gradual degeneration of the nuclei of the cells of the embryo. Another main-

(*Continued on page 8, column 3*)

MICHIGAN SCHOOL CHILDREN ON MUSEUM TOUR

A group of nearly 1,400 children from the schools of Allegan County, Michigan, came to Chicago on May 7 by chartered train especially to visit the Museum. All the visitors were escorted on tours of the exhibits. Because of the size of the groups, seventeen members of the Museum staff had to be assigned to guide service.

Vanguard of a group of nearly 1,400 young visitors from schools of Allegan County, Michigan.

ARMED GUARD PROTECTS MUSEUM COLLECTOR

Zoological collecting while accompanied by a military escort of two to four armed guards is the unusual experience reported by Dr. Fritz Haas, Curator of Lower Invertebrates, who returned to the Museum last month after a three-month expedition to Israel. When recent friction with the Arabs developed, the Israeli government insisted that Dr. Haas not only be armed at all times but that he also accept the protection of the escort during his trips into the field.

Dr. Haas collected mollusks and other invertebrates, both land-inhabiting and

SCIENTIST AND BEDOUIN GUARD

Because of unsettled conditions in the Near East, the Israeli government insisted that Dr. Fritz Haas, while collecting for the Museum, be personally armed and be accompanied by armed military escort. This desert scene is in Wadi El Abyad in Negev.

aquatic, throughout a variety of terrain ranging from the forests of northern Israel to the desert areas in the south and at altitudes from a region of 3,000-foot hills down to the level of the Dead Sea, which is about 1,200 feet below standard sea-level. His collecting was conducted in close cooperation with the Hebrew University in Jerusalem, which expedited his work by providing facilities for travel, preparation, and study. In addition to invertebrates, in which Israel's fauna is unusually rich, Dr. Haas collected some reptiles and other animals for the Museum.

Among objectives of the expedition were observation of the adaptation of invertebrate animals to life under desert conditions and study of the fresh-water life of isolated rivers in the Near East. Dr. Haas delivered two lectures before the biology group of the Hebrew University—one on "Origin and Composition of Pearls" and the other on "Importance of Mollusks for the Reconstruction of Life Conditions in the Past."

From Israel, Dr. Haas traveled through Italy, France, Switzerland, and Germany, collecting en route and consulting with colleagues in various museums. In Frankfort-on-Main, Dr. Haas was welcomed by the Senckenberg Natural History Society, and a medal of Jacob Cretzschmar, founder of the society, was presented to him in recognition of his scientific achievements. He is the first scientist to receive this medal.

NEW MEMBERS

The following persons became Museum members from April 16 to May 14:

Associate Members

Julian H. Levi, Frank Billings Nichols

Annual Members

George Albiez, Dr. Clifford L. Alsin, William D. Bavelaar, David B. Baxt, James P. Baxter, Ray C. Bennigsen, Woodward Burgert, Eugene L. Cohn, Dr. Pauline M. Cooke, William H. Cooke, G. D. Crain, Jr., Mrs. A. W. Cushman, Dr. William L. DeLarye, Peter T. Demos, Robert A. Dwyer, Dr. James B. Flanagan, Nelson Forrest, Charles G. Frank, John M. Frank, Victor E. Gidwitz, Gerson I. Gluck, William Haddow, J. E. Harrington, Rodney D. Harrison, Gerald E. Hendricks, Carl Hirschfeld, Alfred Hochschulz, Arthur M. Holland, William E. Judd, Miss Minnie B. Kaiser, Michael F. Laterza, Paul L. Latham, Dr. Clarence A. Lathrop, Mrs. Nathan Leavitt, M. R. Mackaye, Joseph H. Makler, Frank O. Marks, Sydney R. Marovitz, Samuel A. Marx, Robert B. Mayer, Richard W. McLaren, Dr. Freda Morgan, Robert L. Muckley, John J. O'Toole, S. William Pattis, Harold L. Perlman, Raymond L. Perlman, Robert A. Podesta, James N. Rawleigh, George C. Reeves, W. W. Rice, Kenneth C. Ring, Donald M. Roche, Frank Ryser, Robert L. Sampson, Michael Sappanos, Calvin P. Sawyier, T. H. Schaffer, Mrs. William Sevic, Henry Shapiro, E. John Sierocinski, Dr. Nicholas M. Simmon, George H. Simmons, E. V. Stanley, Miss Sidney A. Steck, A. L. Steele, Marshall E. Strauss, Walter N. Stuckslager, John Temple, William E. Uhlmann, Miss Elizabeth VanHagen, J. L. Vette, T. A. E. Vyse, D. P. Wells, George H. Willis, John S. Woolman, George W. Yeoman

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Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 34, No. 18. *A Colombian Race of Tinamus osgoodi.* By Emmet R. Blake. 4 pages. $.15

Fieldiana: Zoology, Vol. 34, No. 19. *A New Fruit Pigeon from Nepal.* By Austin L. Rand and Robert L. Fleming. 4 pages. $.15

Fieldiana: Zoology, Vol. 34, No. 20. *Mollusks from Ilha Grande, Rio de Janeiro, Brazil.* By Fritz Haas. 8 pages. $.25

Fieldiana: Botany, Vol. 26, No. 2. *Orchids of Guatemala.* By Oakes Ames and Donovan Stewart Correll. 328 pages. $4.

Fieldiana: Zoology, Vol. 34, No. 21. *A New Barbet from French Indo-China.* By Austin L. Rand. 2 pages. $.10

Fieldiana: Zoology, Vol. 35, No. 2. *Placentation of a Primitive Insectivore, Echinsorex Gymnura.* By Waldemar Meister and D. Dwight Davis. 16 pages. $.75

Fieldiana: Geology, Vol. 11, No. 7. *Early Devonian Fishes from Utah, Part II, Heterostraci.* By Robert H. Denison. 64 pages. $1.25

Fieldiana: Zoology, Vol. 34, No. 22. *Marine and Fresh-water Mollusks of the Solomon Islands.* By Alan Solem. 16 pages. $.25

Fieldiana: Botany, Vol. 28, No. 3. *Contributions to the Flora of Venezuela.* By Julian A. Steyermark and Collaborators. 229 pages. $4.25

Fieldiana: Zoology, Vol. 34, No. 24. *Amphibians and Reptiles of Yemen.* By Karl P. Schmidt. 9 pages. $.15

VERNAY ANGOLA SAFARI TO BENEFIT MUSEUM

Through the courtesy of Arthur S. Vernay, of New York, for many years a friend and supporter of Chicago Natural History Museum, the institution will share in the collections of the Vernay–Transvaal Museum Expedition to Angola (Portuguese West Africa). This expedition left Pretoria, where the Transvaal Museum is located, in May and is now well under way. Other institutions participating are the British Museum (Natural History) and the Peabody Museum of Harvard University.

The expedition sponsored by Mr. Vernay, while primarily concentrating on the collection of insects, has a wide range of other objectives including reptiles, birds, small mammals, plants, anthropological data on the native tribes, and investigations of past climates in the Huila, Benguela, Malange, and Bie provinces. Personnel of the expedition includes J. Balfour-Browne, entomologist of the British Museum, and the following members of the Transvaal Museum staff: Dr. G. Van Son and C. Koch, entomologists; J. T. Robinson, anthropologist, and his assistant, K. C. Brain, and A. G. White, taxidermist. The expedition will have a full complement of native helpers and will travel in a fleet of motor vehicles.

Mr. Vernay has presented funds and collections of specimens to Chicago Natural History Museum in the past. In 1930 he financed and led the Vernay-Lang Kalahari Expedition. The Trustees of the Museum have honored him by electing him an Honorary Member, a Patron, and a Contributor.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received recently:

Department of Anthropology:

From: Estate of Henry C. Schwab, Chicago—10 pieces of Chinese porcelain; Robert Trier, Chicago—plate made from mother-of-pearl, Hong Kong

Department of Botany:

From: Albert Greenberg, Tampa, Fla.—Thumbergia; E. J. Palmer, Webb City, Mo.—473 plants; Simon Segal, Chesterton, Ind.—2 Lycopodia; Dr. John W. Thieret, Chicago—90 phanerogams, Illinois, Indiana, Michigan; Grady L. Webster, Ann Arbor, Mich.—15 Phyllanthus, Cuba; Archie Wilson, Flossmoor, Ill.—Castanea, Korea; Dr. T. A. Stephenson, Aberystwyth, Wales—23 algae, Bermuda; Dr. J. J. Symoens, Brussels, Belgium—6 algae, Belgian Congo; Dr. P. C. Silva, Urbana, Ill.—5 marine algae, California; Dr. J. E. Tilden, Hesperides, Lake Wales, Fla.—153 algae, South Pacific, Australia, New Zealand; Dr. G. T. Velasquez, Quezon City, Philippines—28 algae; Dr. Cesar Vargas C., Cuzco, Peru—7 algae; Dr. R. D. Wood, Kingston, R.I.—12 algae; Annie Zimmerman, Chicago—28 algae, California

Department of Geology:

From: B. F. Hazel, Fort Peck, Mont.—Cretaceous fossil crabs and ammonites

Department of Zoology:

From: Marshall Laird, Suva, Fiji—24 frogs, 38 lizards, 2 snakes, Solomon Islands, New Hebrides; Ian M. Moore, El Cajon, Calif.—2 paratypes of a beetle, Mexico; William E. Old, Jr., Norfolk, Va.—2 lots of seashells; David W. Bergstrom, Oxford, Ohio—147 insects and allies, Mexico; Chicago Zoological Society, Brookfield, Ill.—3 birdskins; Albert J. Franzen, Chicago—birdskin; Harry Hoogstraal, Cairo Egypt—130 skins, 123 skulls, 7 skeletons, 4 specimens in alcohol, 16 frogs, 32 lizards, 8 snakes, 18 lots of fishes; Lois Jones, South Bend, Ind.—734 insects and allies, Burma; Mathon Kyritsis, Waukegan, Ill.—12 fishes (6 species); Dr. Harold Trapido, Panama—24 bats in alcohol; U. S. Fish and Wildlife Service, Pascagoula, Miss.—75 lots of fishes (118 specimens), Gulf of Mexico

Raymond Foundation:

From: Dr. R. M. Strong, Chicago—5 black-and-white slides

Library:

From: William J. Gerhard, Chicago; René d'Harnoncourt, Director, Museum of Modern Art, New York; United Food Co., Boston

Daily Guide Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons. Requests for such service must be made at least one week in advance.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 6 P.M.

JUNIOR ARTISTS FIND SOURCE MATERIAL AT MUSEUM

Three of the youngest art students from the classes held in Chicago Natural History Museum by the School of the Art Institute of Chicago are (left to right) Lya Avny, Patricia Anderson, and Bernard Lipshires, all eight years of age. They are seen in the Hall of Fishes with crayon drawings that were among the examples of school children's work selected for a special exhibit last month.

LONGEVITY OF SEEDS—

(*Continued from page 6*)

tains that loss of viability may result from the depletion by respiration of the stored food supply of the seed; still others place the blame upon the degeneration of enzymes, on the gradual coagulation of proteins of the embryo, or on the accumulation of toxic products of metabolism. Many investigators emphasize the importance of impervious seed coats in maintaining viability.

Long-term tests represent an obvious way for determining not only the length of time seeds may remain alive under various conditions but also the environment most favorable for retaining viability during storage. It should be emphasized that the data from such experiments—and indeed all seed longevity data—do not necessarily reveal the maximum life span of the seeds concerned but only the life span under the experimental conditions—figures possibly much lower than the maximum time that viability may be retained under ideal conditions.

The best-known of several buried-seed experiments is the one started in 1879 by Dr. W. J. Beal, then professor of botany at Michigan State College, who buried twenty bottles, each containing a mixture of sand and seeds of twenty species. The original plan was to dig up a bottle every five years for germination tests so that the entire experiment would extend over 100 years. However, in 1920 the decision was made to test the remaining twelve samples at 10-year periods in order that the experiment might be extended over an additional 60 years. The most recent germination test was made in 1950 after the eleventh bottle had been dug up. The seeds of only three of the original twenty species were found to be still viable after 70 years of burial: evening-primrose (*Oenothera biennis*), moth mullein (*Verbascum blattaria*), and yellow dock (*Rumex crispus*).

Based on the thesis that the viability of seeds may be prolonged by storage in dry condition and in the absence of oxygen, a long-term test of seed viability has recently been initiated at the California Institute of Technology. Seeds of about 100 species of California plants were sealed in vacuo in glass tubes after the seeds were quite thoroughly dried. The first set of tubes was opened after one year (in 1948). It was found that the average germination percentage for all the species had dropped somewhat, although certain species showed an increase in germination as compared to tests made at the beginning of the experiment. Present plans call for testing of the next set of seeds in 1957, and subsequent sets at regular intervals until 2307. By that time, with increased knowledge and new techniques, we may be able to keep seeds alive vastly longer than we even imagine at present.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 7-July 1954
Chicago Natural History Museum

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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Members are requested to inform the Museum promptly of changes of address.

WHAT? HOW? WHERE? WHEN? ASK MUSEUM SWITCHBOARD

BY CAROLYN HIRSHFIELD

How would a switchboard operator, working for some business firm, react when upon answering a call, instead of a salutation, she heard—"How fast can a pheasant run?" "How many grains of salt in a single drop of ocean water?" "What is the color of the belt on the Statue of Liberty, and what time is the next bird walk?" As the switchboard operator at Chicago Natural History Museum, of the 300 to 400 calls I receive each day, approximately three-quarters are questions and need to be referred to specialists on the staff.

Once in a while calls come through that are scarcely believable.

Take, for instance, the excited woman who informed me that on opening a hard-boiled egg for her son's lunch, she had found two yolks in it. What should she do? Dr. Austin L. Rand, Curator of Birds, told her quite naturally—"Eat it." Or the woman who wanted to find a man-eating plant, as a birthday gift for her husband. She, I'm sure, never forgave the Curator of Economic Botany for telling her that plants like that existed only in science-fiction.

In my capacity as receptionist, I receive almost as many interesting visitors as phone calls. People who have "just cleaned out their attics" and feel confident that we *must* want the old spinning wheels, letters, grandmother's dresses and old muskets they found there. There are also the world travelers, who for a few dollars can "*force*" an antique dealer to part with a "valuable museum piece." One man brought in a very "rare" American-Indian relic. Not only was it worthless, but a magnifying lens disclosed the barely discernible legend—"Made in Japan."

However, a good many of the specimens brought in are indeed treasures and gifts for which the Museum is grateful. For example, a young lady came into my office one summer afternoon lugging a large statue which she quickly shoved in back of the opened door, thus concealing it from view. She explained that her husband who was in the South Pacific had sent it to her, and as he had already written Dr. Alexander Spoehr, former Curator of Oceanic Archaeology and Ethnology, concerning it, all that was necessary now was to leave it. With that she gave her name and departed. Later that day, Dr. Spoehr came down for it. He pulled back the door and started to laugh. It appeared that the lady, seemingly not used to the primitive art of the natives, had covered one-half of the statue with one of her organdy aprons which fastened in back with a huge pink bow. But actually the carved figure was a most acceptable addition to the Museum collections.

To get back to the switchboard, which is my big job, I often wonder what number the man wanted when he got ours by mistake, for upon hearing the words Natural History Museum, he shouted in my ear, "Museum?—boy, have I got a wrong number!"

CURATOR GIVES MUSEUM A NOTABLE COLLECTION

William J. Gerhard, Curator Emeritus of the Division of Insects, has presented his personal collection of insects of the order Hemiptera to the Museum. Mr. Gerhard's special interest in the Hemiptera began before he joined the Museum staff in 1901. During his succeeding fifty years of service to the Museum, he devoted much of his spare time at home to the study of the Hemiptera and to building up a critical reference collection that includes more than 10,000 finely prepared specimens of about 1,500 carefully identified species. It forms the major component in the Museum's representation of this important group of insects.

Entomologists like to restrict the term "bug" to the members of the order Hemiptera. Among the best known of these creatures are the cicadas, whose shrill rasping buzz is a familiar sound of summer.

THIS MONTH'S COVER

For the first time in its history, the front page of the Bulletin this month is embellished with a "cover girl"—the sculpture of a young woman of Ethiopia. This head, in black marble, is one of the famous Races of Mankind series by the noted artist Malvina Hoffman, and was presented to the Museum by Mrs. Charles H. Schweppe. A hundred other representatives of the peoples of the world, most of them in bronze, as portrayed by Miss Hoffman, are on exhibition in Chauncey Keep Memorial Hall (Hall 3). During the current visit to the United States of Emperor Haile Selassie I of Ethiopia it is of interest that this Museum, as a result of two expeditions to the Emperor's country, has a noteworthy collection of Ethiopian mammals in its African Hall (Carl E. Akeley Memorial Hall—Hall 22), some of which are shown elsewhere in this issue.

The scientific interest of the order includes the complex life cycle with parthenogenesis and alternation of generations of the aphids or plant-lice. The Hemiptera are unusually important insects to man because most of the species suck juices of plants and injure or destroy their hosts which include many agricultural and garden plants. The plant-lice, or aphids, scale-insects, leaf-hoppers, and stink-bugs are well-known members of this group. Other forms, such as bed-bugs and kissing-bugs, feed on the blood of human beings and other animals. On the other hand, a number of species have been extensively utilized by man because they produce such substances as wax, cochineal and other dyes, and lac for varnishes and other purposes. The most reasonable explanation of the "manna of the wilderness" of Biblical times is that it was a sugary secretion produced on plants by certain scale-insects.

Girl Scouts to Use Museum

The five Mondays from July 12 to August 9 inclusive have been designated Girl Scout Days at the Museum. On these days Girl Scouts are invited to explore the Museum and to take advantage of the help offered by the Raymond Foundation guides who will be available to answer questions on certain specified subjects. Several exhibit cases will be marked for these subjects to aid the scouts in answering questions in their handbooks, and to further their work for nature proficiency badges.

TIME CLOCKS IN BIRDS? PERIODIC FORCES IN LIFE CYCLE

By AUSTIN L. RAND
CURATOR OF BIRDS

TO THOSE of us who grew up in a northern country the importance of the slow climb of the sun in the heaven from the winter solstice of December to the summer solstice of June is an old story. Our pagan ancestors marked the sun's climb and celebrated it with fire festivals. One of the functions of Stonehenge was to record the summer solstice, whence the fact was flashed across the countryside by a system of bonfires.

The returning sun loosened nature from the dead grip of winter and started life anew, a resurrection once symbolized by pagan rites that in Christendom were replaced by Easter.

The returning sun and spring start birds nesting. The different kinds respond differently. The great-horned owl may nest in February when the northern woods are deep in snow and the temperatures dip below zero, but when its slow-growing young are on their own, they will find young rabbits plentiful. The bluejay may wait until May when food for its young is most plentiful, and the goldfinch may wait until August when the thistle seeds on which it feeds its young will be ready. But all seem to depend on the return of the sun.

LIGHT'S EFFECT PROVED

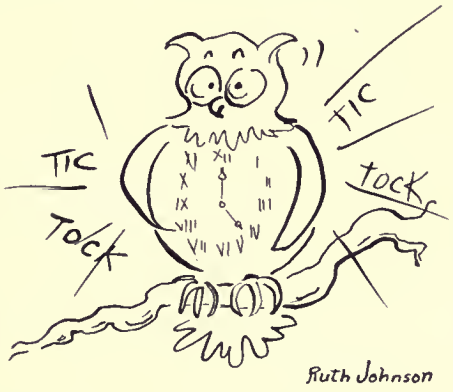
The actual effect of the sun's seasonal climb, through lengthening daylight, on the breeding condition of birds became known to scientists only in the 1920's. Then, experimentally, Dr. William Rowan, of the University of Alberta, showed that juncos, kept captive in Alberta, could be brought into breeding condition in winter by giving them increased illumination. Further work corroborated the discovery. The amount of light actually does affect the birds' system, bringing on a breeding condition, molt, and presumably migration.

Some extreme students even hold that this is the timing of all breeding seasons. But as we go farther afield, out of our northern clime with only a spring and summer suitable for breeding, we find this wouldn't hold. Consider the birds of tropical East Africa. It's a rather arid land, but twice a year the rains bring a season of growth to the vegetation, when insects can prosper. And here we find that many kinds of birds have two breeding seasons a year. It seems that the rains, rather than the sun, furnish the timing device. But a puzzling feature is that some birds may come into breeding condition before the rains start, anticipating their arrival, which suggests that some other timing factor is involved.

If we transfer our attention to the vast equatorial forest of Central and West Africa where rain, temperature, and daylight are uniform throughout the year, we find that under these uniform conditions some kinds of birds breed throughout the year. It seems that without variation in daylight or rainfall, there's nothing to cause an annual cycle.

SOOTY TERNS HAVE OWN CYCLE

But the sooty terns of Ascension Island, in the Atlantic Ocean about seven degrees south of the Equator, provide a disturbing note. Here the breeding terns enjoy a climate uniform throughout the year, but they breed once every 9.6 months, reports Dr. J. P. Chapin of the American Museum of Natural History. Without apparent external control, there is a breeding cycle of less than twelve months. It makes one wonder whether or not there is an inherent fixed rhythm in the birds themselves, perhaps only modified locally by changing daylight or by rains. These sooty terns are the most interesting as a species in that with their widespread, pantropical range they show three types of breeding rhythm or cycles: some, such as the population breeding on the Dry Tortugas off Florida, breed once a year, in the spring; some, on certain Pacific islands, breed twice a year; and, as we've just said, the Ascension Island birds breed once every 9.6 months.



In a search for further collateral evidence I came on Dr. Frank A. Brown's work on fiddler crabs at Woods Hole Biological Station in Massachusetts. Fiddler crabs have a daily 24-hour color-change rhythm, becoming pale at night and, presumably as a protection against sunlight and against predators, dark during the day. Superimposed on this they have another shorter color-change of 12.4 hours. Though dark in color during the day they assume a maximum darkness at the time of low tide, when presumably they would be most vulnerable to sunlight and to predators. The tides, which do not correlate with the solar day but with the moon, fall behind 50 minutes a day. The crabs' tidal (or lunar) cycle of color-change coincides in phase with the diurnal 24-hour cycle only once every 15 days. This is interesting, but the astonishing thing is that crabs kept for two months in complete darkness, in a photographic darkroom, continued to show these two cycles of color-change. An innate time-sense or an innate rhythm seemed one possible explanation. Such things have been postulated before. The most popular explanation has been that such rhythms are determined by metabolism, with hunger, fatigue, or rest from fatigue being postulated as the the factors involved.

But this is ruled out in the case of the crab, for the crab is cold-blooded. Its body temperature tends to be that of its environment. And with temperature changes, the metabolism changes: it speeds up with warmer temperatures and slows down with colder ones. Yet Dr. Brown found that keeping these crabs at various temperatures from 6 degrees to 26 degrees Centigrade did not affect either of their time-rhythms. Evidently they are not controlled by metabolism.

But let us not speculate on a time clock or a calendar clock in our animals similar to the alarm clock that Sir James Barrie's crocodile swallowed and that warned Captain Hook of the crocodile's predatory approach by ticking. Rather it seems that in addition to light, which may be the factor at times and which can be a modifier at others, we must keep in mind that there may be other periodic or cyclic forces operating in the world to which some animals respond.

TWO LECTURE TOURS DAILY OFFERED IN SUMMER

During July and August, lecture tours of Museum exhibits will be offered in both the mornings and the afternoons of weekdays, Mondays through Fridays inclusive; on Saturdays and Sundays tours will be omitted.

Except on Thursdays, the morning tours will be devoted to the exhibits in one specific department. The afternoon tours (and Thursday morning) will be comprehensive in scope, touching on outstanding exhibits in all departments. Following is the schedule that will be followed weekly:

Mondays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—Records from the Rocks
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—Animals Around the World
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits.

ANCIENT EGYPTIAN SUN-BOAT EXHIBITED HERE

By RICHARD A. MARTIN
CURATOR, N. W. HARRIS PUBLIC SCHOOL EXTENSION*

RECENTLY the finding of a mortuary boat near the south base of the great pyramid of Khufu (2600 B.C.) was announced by the Egyptian Department of Antiquities. This is the first actual boat to be discovered in the Giza pyramid complex, and, if it is a part of the funerary equipment of Khufu, it is the oldest mortuary boat thus far to be excavated by modern archaeologists.

That such boats were placed near the pyramids of the pharaohs of the Old Kingdom (2700–2200 B.C.) has been known for some time, as boat-shaped hollows hewn in the bedrock near the pyramids have previously been found: three on the east side of Khufu's pyramid, five at the base of the nearby pyramid of Khaf-Re, one at the pyramid of Dedefre at Abu Rauwash, and one at the pyramid of Unis near Saqqara. These boat chambers had originally been roofed over with huge stone slabs, but unfortunately all had been robbed of their contents in ancient times.

SUN-BOAT OF KING SESOSTRIS III

This boat, on exhibition in the Museum's Hall of Egypt (Hall J), is one of three well-preserved sun-boats found by the archaeologist J. de Morgan in 1894 near the brick pyramid of Sesostris III, fifth king of the Twelfth Dynasty. The others found at the same site were mere fragments in the sand. The sun-boat in the Museum is 32 feet long and 8 feet wide. It is constructed of cedar wood in the same general form as the earliest Egyptian type of boat made of bundles of papyrus—the "Great Reed Float" of the Sun-God, Re.

JOURNEYS WITH SUN-GOD

Mortuary boats played a very important part in the religious beliefs of the Egyptians. In them the dead pharaohs in their afterlife were believed to join the sun-god Re on his journeys during the day and night. This excerpt from a Pyramid Text indicates the significance of the boats:

Thou risest and settest; thou goest down with Re, sinking in the dusk with Nedy.
Thou risest and settest; thou risest up with Re and ascendest with the Great Reed Float.
Thou risest and settest; thou goest down with Nepthys, sinking in the dusk with the Evening Boat of the Sun.
Thou risest and settest; thou risest up with Isis, ascending with the Morning Boat of the Sun.

Because of their importance in the afterlife, the mortuary, or sun-, boats seem to have played a major role in the funeral ritual. Scenes from tomb sculptures of the Old Kingdom suggest that an actual voyage on the Nile was made in these boats on the way to the tomb and that certain funeral rites were performed on this journey. The lead sun-boat carried the coffin, a few officiating priests, and the wife of the deceased. Other sun-boats transported important personages and objects for the funeral ritual and the life in the hereafter. The only crew member on a sun-boat during this voyage was the helmsman equipped with a large steering oar, as the sun-boats were towed on the water by other boats with many oarsmen. When they reached a place on the river near the tomb, the sun-boats were hauled up the bank and over the sand by men to the burial place.

SUBSTITUTE FOR BOATS

After the Fifth Dynasty (2350 B.C.) the pharaohs seem to have been content to go without stone "tombs" for their sun-boats. The boats were then protected by brick shelters or simply buried in the sand. Eventually model boats and tomb scenes depicting boats served as substitutes for actual boats to be used in the afterworld.

A sun-boat from the Twelfth Dynasty is on exhibition in Chicago Natural History Museum (Hall J—Peoples of Ancient Egypt). This boat is one of five found buried in the sand at the base of the pyramid of King Sesostris III (1878–1840 B.C.) at Dashur. It is complete with steering oar for the helmsman. The boat is the only one of its kind in the United States. It was presented to the Museum by Mrs. Cyrus H. McCormick.

* Formerly Curator of Near Eastern Archaeology.

STAFF NOTES

In recognition of research completed and published, Ph. D. degrees were conferred upon three members of the Museum's scientific staff in June. Those receiving their doctorates are **Donald Collier,** Curator of South American Archaeology and Ethnology, and **Robert F. Inger,** Curator of Amphibians and Reptiles, both of whom were thus honored by the University of Chicago; and **Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, who received his degree at Princeton University. . . . **Loren P. Woods,** Curator of Fishes, recently reconnoitered Kentucky caves for blind fishes for which the region is famed . . . . **Dr. Theodor Just,** Chief Curator of Botany, has left for Paris where he will represent the Museum at the International Botanical Congress. . . . **Dr. Austin L. Rand,** Curator of Birds, has returned from Basel, Switzerland, where he was a delegate to the Eleventh International Ornithological Congress . . . . **Colin C. Sanborn,** Curator of Mammals, and **Philip Hershkovitz,** Associate Curator of Mammals, last month attended the meetings of the American Society of Mammalogists at Estes Park, Colorado. Mr. Sanborn presented a paper on "Recent Rabies Infections in Herbivorous Bats." . . . **Dr. Francis Drouet,** Curator of the Cryptogamic Herbarium, is on leave to conduct botanical courses at the Lake Itasca Forestry and Biological Station where the University of Minnesota has a summer school . . . . **Miss Margaret Bauer,** Secretary of the Department of Zoology since 1941, has resigned to embark upon a business career . . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently spoke before the Barrington Natural History Society on "Identification of Wildflowers." . . . With regret, the Museum records the death on June 15 of **Frank F. Gottsch,** age 79, a member of the guard force since 1944.

Museum a Vacation Mecca For School Children

With the recent closing of Chicago's schools for the summer, every day from now until the end of the long vacation becomes a children's day at the Museum. Colonel Clifford C. Gregg, Director, has issued his annual invitation to children—and their parents—to make full use of the institution as a vacation haven.

The Museum is a safe place for parents to leave their children; further, on scorching days it is one of the coolest places in Chicago. It offers the children fun, yet contributes educational influence whereby they unconsciously continue absorbing knowledge while they are enjoying themselves. Admission is free to children every day of the week.

CORAL REEF FISHES FROM BIKINI HERE

Chicago Natural History Museum has received a series of more than 5,000 specimens representing over 500 species of coral reef fishes from Bikini and the northern Marshall Islands. These fishes are part of a collection made by the staff of the Division of Fishes, United States National Museum, under the direction of Dr. Leonard P. Schultz, Curator of Fishes. The first volume of a descriptive catalogue of the collection has recently been published and a second volume is being completed. The Museum has received the valuable coral reef fishes as a result of the collaboration by Curator of Fishes Loren P. Woods in the preparation of this catalogue. These fishes and the report based on them will be a point of departure for further studies on Pacific coral reef fishes for many years to come.

WHO'S A COW?

By PHILIP HERSHKOVITZ
ASSOCIATE CURATOR OF MAMMALS

ELSIE, that highly publicized and uberous lady, is a member of a select and astonishingly varied company that includes even whales, elephants, hippos and giraffes. The term cow was first used for the female of the common domestic animal the male of which is called bull or ox. In fact, when the English language was in the early stages of integration, there was a different word for each sex and even for the plural of most of the important animals known to the inhabitants of the British Isles. As new lands and new animals were discovered, new names had to be supplied. Unfortunately, English grammar provides no uniform ending or general rule for forming the gender of nouns. One either used such familiar feminine names as cow, doe or vixen for the female of an exotic animal, or he simply used a common name for both sexes. Naturally, the name cow could be applied without hesitation to females of all species of wild cattle. These include bison, the African and Asiatic buffaloes, the Central Asiatic yak, the Indian gaur, the Philippine tamarao, and the little anoa of the Celebes. On the other hand, rule of thumb had to be used to determine whether the female of an African antelope was to be called a cow, because of its size or some other trait so suggested, or whether it was to be called a doe because it was smaller and of a more graceful frame. Usage then determined whatever designation was to become established.

It is not surprising that the females of manatees and dugongs, the sirens of ancient mariners, should be called cows. In fact, sea cow is the general term for these animals. All large, heavily built marine mammals such as whales, seals, sea-lions and walruses are either bulls or cows, according to sex. On land, the same criterion is used and the largest terrestrial mammals of the Old World, the elephant, rhinoceros, hippopotamus, and giraffe are either bull or cow according to whether they are male or female. Likewise, the largest ungulates of the New World, including the caribou, elk, and moose, are either bull or cow, not stag and doe, respectively. The female domestic reindeer, because it is large, kept in herds, milked and slaughtered for flesh and hide, is a cow, not a doe. The largest tropical American terrestrial animal, the tapir, is a close relative of the horse, but the female tapir is a cow, not a mare. In British Guiana, the tapir is simply "bush cow" without regard to sex.

Because of the association of ideas, the term cow has been extended to some non-mammalian organisms. The terrapin is a turtle often called a cow because it was kept like cattle and used for food by certain American Indians. The cow tree of the Venezuelan and Colombian Andes is "milked" for the latex that tastes, looks, and fattens the drinker, like cow's milk. The common plant aphid is sometimes called a cow because it is tended and "milked" by ants. However, such are the vagaries of the English language that the females of all bulls are not cows, and the males of all cows are not bulls. Whoever heard of a bull bird or of a cow frog?

Exhibits of families of orchids, bananas, marine algae, fungi, lichens, horsetails, and clubmosses in Martin A. and Carrie Ryerson Hall of Plant Life (Hall 29) have been renovated and rearranged.

BROWNIES GO ON 'SAFARI' IN MUSEUM HALLS

The young girl seen next to the African waterhole exhibit busily taking notes and snapping pictures some Saturdays ago was engaged in very important work—she was "on an expedition to Africa" and like all good naturalists she was observing the life around her and recording what she saw. The expedition trail she was following was mapped out by the Raymond Foundation for Brownie troops who attended the Saturday morning movie on Africa. Armed with what they learned from the movie the Brownies started out on their miniature expedition remembering the advice of the Raymond Foundation to be always alert to see, make notes, collect material, make sketches and take pictures. After the expedition returned home the members prepared notebooks in which they included their notes and sketches. Following are two excerpts from these notebooks:

"No other animal [the elephant] looks so much alike at both ends and has skin an inch thick yet has such a poor heating system that its owner is as easily frosted as a bean plant. Nor is there another animal with its nose drawn out into a long trunk that it uses as a hand or whose skull is fifteen inches thick or whose front teeth are often so heavy that it gets tired from carrying them."

"The camel is used as a Beast of Burden in Africa, not choosy about food, eats thorny desert plants. Drinks any muddy lukewarm water in large amounts at a time, it can go for a week without water.

"The camel is one of the ugliest, meanest and most useful of all animals. It has been man's servant for longer than any other creature except the human slave."

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received recently:

Department of Anthropology:

From: Byron Harvey III, Chicago—Ashanti brass weight, West Africa

Department of Botany:

From: Miss Gertrude French, Park Ridge, Ill.—*Collinsia verna;* E. J. Palmer, Webb City, Mo.—442 phanerogams; Dr. Hans M. Peters, Tubingen, Germany—3 phanerogams, Honduras; Yale University, New Haven, Conn.—23 Venezuelan Plants, Venezuela

Department of Geology:

From: Holly Bennett, Chicago—rock and mineral specimens, Oregon and California; Charles A. Steen, Moab, Utah—uranium-vanadium ore specimens; Clayton Stocks, Moab, Utah—uranium-vanadium ore; O. R. Wray, Quebec, Canada—varved clay

Library:

From: H. P. Peterson, Chicago

ETHIOPIA IS BROUGHT TO CHICAGO IN MUSEUM EXHIBITS

GUEREZA MONKEYS

MOUNTAIN NYALAS

ANIMALS OF MANY KINDS MEET AT A WATERHOLE IN SOUTHERN ETHIOPIA

Chicago Natural History Museum possesses, in Carl E. Akeley Memorial Hall (Hall 22), a notable collection of Ethiopian animals collected by two expeditions in the 1920's. The recent Chicago visit and the continuing good-will tour of the United States by Haile Selassie I, Emperor of Ethiopia, lent a reflected timely interest to these exhibits, especially since the Emperor had actually played a considerable role in aiding the two Museum expeditions that collected the specimens in the groups.

The expeditions were the *Chicago Daily News*–Field Museum Abyssinian Expedition (1926–27) led by the late Dr. Wilfred H. Osgood, then Chief Curator of Zoology, and an expedition financed and led for the Museum in 1928–29 by Captain Harold A. White of New York and Major John Coats of London. Emperor Haile Selassie (at that time known as Ras Taffari, "Regent of the Empire and Heir to the Throne") received members of both Museum safaris at his capital, Addis Ababa. The hearty personal co-operation he extended to them in preparing for their trek through remote parts of his country contributed in large measure to the success of their collecting efforts, and their safety against various hazards.

The *Daily News* expedition personnel included, besides Dr. Osgood (who was one of the country's foremost zoologists), the late Louis Agassiz Fuertes, famed both as an artist and ornithologist; Dr. Alfred M. Bailey, then a member of this Museum's zoology staff and now Director of the Denver

GELADA BABOONS

DASSIE OR CONEY

DIK-DIK, WORLD'S SMALLEST ANTELOPE

Museum of Natural History; James E. Baum, Jr., special writer whose syndicated articles on the expedition were widely published and later appeared in book form; and C. Suydam Cutting, Honorary Member, Patron and Contributor of the Museum.

The Museum's largest habitat group, the reproduction of a scene at an African waterhole, includes many of the larger animals found in southern Ethiopia, among them rhinoceros, giraffes, elands, oryx and gazelles. All were collected by Captain White, Major Coats and C. J. Albrecht.

Outstanding among several groups collected by the *Daily News* expedition is the mountain nyala, a rare creature whose existence did not become known to zoologists until as recently as 1911. It is an especially beautiful antelope, and the males, like some of their African relatives, have spiral horns. It is sometimes called the Queen of Sheba's antelope. The Queen figures prominently in the traditions of Ethiopia, and Emperor Haile Selassie claims direct descent from both King Solomon and the Queen of Sheba. Other groups in the exhibits resulting from this expedition include gelada baboons, guereza monkeys, Abyssinian dassies or coneys, and dik-diks, the world's smallest antelopes which are only about the size of rabbits.

NEW MEMBERS

The following persons became Museum Members from May 17 to June 15:

Associate Members

Dave Edelson, Truman K. Gibson, Jr., Louis Kopinski, David Silberman, Jr., C. N. Wesley

Sustaining Member

Paul M. Plunkett

Annual Members

Hubert E. Allen, Dr. B. J. Anson, George E. Bailey, John L. Baker, Elmer Balaban, Norman J. Barry, Herman Bartholomay, Miss Lucy F. Barton, Dr. Robert A. Beebe, Dr. John V. Belmonte, William Bessy, George O. Bohrer, Giulio Bolognesi, Fred Bryant, Ivo W. Buddeke, John L. Cella, Dr. Mitchell S. Corbett, A. J. Dunsmore, Stanton L. Ehrlich, F. F. Elliott, Harold English, Thomas P. Feely, Meyer Field, Morgan L. Fitch, Jr., Fred S. Floyd, Irving Frank, Dr. Eric Friedland, G. F. Gerk, Fred W. German, William Graffis, Mrs. John Hamilton, George Hartung, Jr., Daniel T. Hayes, F. Robert Hodges, Samuel E. Hokin, Morris Z. Holland, Dr. Bernard Horn, L. H. Horn, A. J. Irwin, N. Howard Johnson, R. S. Kalwajtys, Thomas J. Keating, William D. Kerr, Edward Kohn, M. L. Kresge, H. A. Lansman, Mrs. Louis Leavitt, Max Lurie, S. C. Lurie, Van E. Marker, John L. Marley, Dr. John J. Marlowe, E. R. McCoy, C. Logan McEwen, Martin J. McGuire, Leo A. Miller, Michael Morris, Henry Moss, Jerry Moss, Roger Mullaney, Dr. Joseph J. Mullen, A. K. Orschel, Alfred H. Perlman, W. A. Perry, Harold E. Peterson, J. W. Pope, Carl J. Powers, King Peter Ray, William H. Rector, Dr. Arthur G. Rink, James J. Ripley, Mrs. Donald I. Roth, Don Sack, John H. Sawyer, Miss Gertrude Schneider, Charles L. Schrager, Joseph T. Shuflitowski, James R. Simmons, Bernard Peacock Smith, Francis B. Stine, Smith W. Storey, Miss Marie Strode, K. G. Swanson, Charles R. Swibel, S. A. Van Dyk, Vernon E. Victorine, Dr. Harold C. Voris, C. F. Weinreich, Dr. F. Howell Wright

MUSEUM INVITES CHILDREN TO FREE SUMMER MOVIES

Thursdays from July 8 to August 12 inclusive are special children's days at Chicago Natural History Museum. On those six days, in addition to the usual attractions of the exhibits, the Museum will present, under the auspices of the James Nelson and Anna Louise Raymond Foundation, the annual Summer Series of free programs of motion pictures. The films to be shown combine entertainment with education in natural science. There will be two showings of the movies on each program, at 10 A.M. and 11 A.M., in the James Simpson Theatre of the Museum. Dates and titles of the films are:

July 8—BAMBI'
Walt Disney's story of the deer

July 15—ANIMAL STORIES
Also a cartoon

July 22—EL NAVAJO
The life of the Navaho Indians in the Southwest
Also a cartoon

July 29—LAND OF THE LONG DAY
Eskimos of Baffin Island
Also a cartoon

August 5—KANGAROO ISLAND
Also a cartoon

August 12—VACATION COUNTRY
Carlsbad Caverns, Grand Canyon, and the Rockies
Also a cartoon

On the first program, July 8, because the film is an extra-long one, the second show will begin at about 11:20 A.M. instead of 11.

MEMBER OF MUSEUM STAFF WINS GOLD CUP IN JEWELRY CRAFT CONTEST

Miss Ruth Johnson, winner of gold cup.

Prize creations displayed by Miss Jonie Johnson.

Miss Pat Lyons with prize-winning jewelry.

At the opening of the Fourth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition held at the Museum in June under the auspices of the Chicago Lapidary Club, two models, Miss Jonie Johnson and Miss Pat Lyons (above at center and right respectively) were sent to the Museum through the courtesy of Patricia Stevens Studios to pose for newspaper photographers.

But the real honors of the show were taken by a young lady on the Museum's own staff, Miss Ruth Johnson (above, photograph at left), secretary in the Division of Birds, who became interested in jewelry creation only a few months ago. She won a gold cup as first prize for the best enameled jewelry in the novice division of the contest. Miss Johnson is shown here with both her prize-winning work and her award.

SCIENTIFIC HOPE CHESTS FILLED ON EXPEDITION

The idea of glamor associated in the public's mind with a museum collector's work in the field—safaris hunting big game, archaeologists digging up treasures of ancient times, and paleontologists unearthing skeletons of huge dinosaurs—is often refuted by the facts of the manner in which much serious scientific collecting is actually accomplished.

For example, Bryan Patterson, Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils, have just returned to the Museum from a two months' field trip to northern Texas with the seemingly drab acquisition of nothing but some wooden boxes containing about 1,000 pounds of concentrate resulting from the washing and sifting of some five tons of sand.

But, as experience in previous collections from the same locality has shown, when the crated concentrate is further sifted in the Museum laboratories, it may be expected to yield important microscopic specimens of tiny fossil vertebrates of early Cretaceous age. And this prospect is as exciting and satisfying to Patterson and Gilpin as would be truckloads of gigantic specimens of *Tyrannosaurus* and mastodons—in fact, more so, since the facts about the large fossil creatures are pretty well known, whereas the scientists expect their sandboxes to reveal species of which little or nothing has been learned to date.

EXPERT ON PHILIPPINES NAMED TO FELLOWSHIP

E. D. Hester, who served the United States government for years in various official capacities in the Philippine Islands, is the first appointee to the Museum's recently established Thomas J. Dee Fellowship, in Anthropology. The late Mr. Dee, a Museum Contributor, founded the fellowship fund to make possible important and highly specialized research projects.

Mr. Hester's assignment in the Museum under the fellowship involves the planning and supervision of work pertaining to the movement, checking and rearrangement of the ethnographic collections from the Philippines, Southeast Asia and Oceania. This ties in with his other work in the Philippine Studies Program of which he is Associate Director. That program, established last year, is financed by the Carnegie Corporation of New York, and is conducted through three Chicago institutions: the University of Chicago, Newberry Library (Ayer Collection), and Chicago Natural History Museum. The Oceanic, Malaysian, and Indonesian collections will be housed in a new storeroom of modern design now nearing completion in former Hall H. The project, which is aimed at achieving the maximum efficiency in the handling, preservation, and study of the collections, is being materially aided by generous grants from the Wenner-Gren Foundation for Anthropological Research and the Philippine Studies Program.

Mr. Hester's government service in the Philippines covered a span of thirty years during which he was economic adviser to governors-general, high commissioners and (since granting of independence to the Philippines in 1946) to American ambassadors. During his stay in the islands he traveled widely, and was associated with the eminent archaeologist H. Otley Beyer (an Honorary Member of this Museum). Over a period of fifteen years Mr. Hester assembled a noteworthy collection of Chinese ceramics recovered from Philippine burial sites and caves. This collection, numbering more than 800 items, is now on deposit in the Museum.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 8-August 1954
Chicago Natural History Museum

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FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

BRASS BAND SALUTES SCIENTIST AT WORK

BY GEORGE LANGFORD
CURATOR OF FOSSIL PLANTS

ANYONE who has spent much of his life in the pursuit of natural-history material amasses a rich variety of experiences, ranging from the comical to the dramatic and even dangerous. I have had my share of those, and the most amusing one seems well worth the telling.

In the winter of 1901–2, the late John Bamford, a farmer residing near Whitewillow in the southeastern corner of Kendall County, Illinois, decided to convert a boggy spring in his pasture into an open well for stock. At a depth of about five feet he began to find bones in abundance, including many of the American mastodon. With the aid of enthusiastic neighbors, all as inexperienced as he in handling such material, a great quantity of bones was excavated, much of it irreparably ruined by rough handling. Further, since interest of the unskilled excavators naturally centered on the larger mastodon bones, remains of smaller animals were for the most part simply thrown into the dump.

Under the delusion, unfortunately rather common, that the material was immensely valuable, Bamford declined to co-operate with any scientific institution, deciding instead to make a small fortune by exhibiting the bones for a fee at his farm and at county fairs. This he tried for several years, the expected fortune failing to materialize and the specimens suffering further damage.

My own connection with this discovery dates from 1910. By that time the local excitement had long since died down and Bamford had ceased his exhibiting. On my first visit to his farm, I found him away for a two-week absence. His wife was on the premises, however, and it did not take me long to learn that she had become thoroughly tired of the bones, which so filled her cellar that access to it from the kitchen was blocked. Permission to make an examination was readily granted.

A DIPLOMATIC MISSION

The only way to the cellar was through a hole under the front porch, through which I had to crawl on hands and knees. The cellar was packed to the ceiling with vertebrae and limb bones, jaws, teeth, and tusks. On emerging I began the delicate task of obtaining permission to remove the material. Mrs. Bamford demurred at first, but finally consented after I had agreed to give the bones the best of care and to acknowledge her husband as the lawful owner.

Thinking it best to move rapidly lest there be a change of heart, I set about preparing to take the first load then and there. This proved to be no small undertaking in my open-top automobile of 1910 vintage. I had, of course, no packing material with me and was forced to do the best I could with long grass pulled from a field near by. When I had placed everything aboard that could safely be carried, the pile of bones in the back of the automobile extended a good three feet above the top of my head. After a difficult sixteen miles over black dirt roads I finally reached the west side of Joliet, the town in which I then lived. I thought my troubles were about over, but in reality they were just beginning. My office was on the east side of town, and much was to happen before I got there. Heads turned as I went by, and first one person, then another, and yet another began to follow me, all keeping up without difficulty since I had to drive as slowly as possible to avoid jolting the fragile cargo.

WHITEWILLOW MASTODON TUSK

Photo made in 1912 of Curator George Langford with specimen found on farm in Kendall County, Illinois. The tusk is about 9 feet long measured along the triple curves from base to tip, and is now in the collections of the Museum.

THIS MONTH'S COVER

The Hopi Indian weaver on this month's cover is one of a family group in the life-size model room of a Hopi apartment-house on exhibition in Hall 7. The exhibit has recently been reinstalled, as have many others in the hall. Among them is an Antelope altar of the type that members of the Antelope Secret Society build during their annual Snake-Antelope ceremonial. An article about this ceremonial appears on page 3.

Nothing grows like a crowd. Within a few blocks I was completely surrounded and could move neither forward nor backward. This attracted one policemen after another until no less than six had gathered. With this reinforcement, the way was cleared and the procession resumed, police in the van, the load of bones in the place of honor, and the crowd bringing up the flanks and rear.

BAND JOINS PROCESSION

Only one thing was lacking, and this was soon supplied. As we neared the Township High School, we encountered the band engaged in marching practice. The boys took in the situation at a glance, wheeled into line at our front and struck up a lively march. Like a circus parade we passed through the center of town and onto the east side, where we finally reached my office and unloaded the bones.

Four more trips were required to complete the transfer, but these were uneventful. With the bones adequately packed and covered by a tarpaulin, I was able to sneak through town without attracting attention. There was, to be sure, an interesting interview a few days later when Bamford appeared with fire in his eye, but I succeeded in mollifying him, and his collection passed into my possession and, later, into that of Chicago Natural History Museum.

With the subsequent donation of a second smaller collection from the same place made by the late Judge George Bedford of Morris, Illinois, one of the original excavators in 1902, the Museum acquired nearly all specimens that had been salvaged from this interesting discovery. The American mastodon is represented by remains of at least nine individuals ranging in age from calves to adults. Other animals encountered include the musk sheep, Virginia deer, wapiti, an extinct type of moose, and bison.

HOPIS RISK VENOM OF SNAKES IN RITUAL TO END DROUGHT

By BARBARA POLIKOFF

THE THREE ROCKY MESAS in northern Arizona that hold upon their summits eight villages comprising the home of the Hopi Indians are inhospitable to the civilization of man. Only through ingenuity and consummate patience have the Hopis managed to coax from this barren land the crops upon which their precarious economy depends. So it is with solemnity that the Hopis will observe this month, as they have for the sun-drenched Augusts of many centuries gone by, their Snake-Antelope ceremonial in which they petition the gods to visit their desert-lands with rain.

Drawing by Wendell Hall

SNAKE DANCERS OF THE HOPI TRIBE IN ARIZONA

This ceremony occurs annually in one or more villages (but only every second year in any one village). A priest sets the exact date on the basis of astronomical observations. Most of these rites, which last nine days, are witnessed only by members of the Snake and Antelope societies who participate in them, except for rare instances when scientific observers have been able to befriend the Hopis and gain admittance into the underground ceremonial chambers (*kivas*). (An Antelope altar from such a kiva is on exhibition in Hall 7 of the Museum.)

Although each of the five villages that hold the ceremonial has its own variation of the many rituals that take place, a basic pattern of altar-building, sandpainting, smoking, singing, praying, acts of purification, etc., is common to all. So elaborate and complex are these rites that not even the Chief Snake Priest or Chief Antelope Priest knows what every one of them means.

As J. Walter Fewkes, one of the anthropologists who gained entrance to the kivas, commented: "There are two fundamental factors, however, which he [the priest] can comprehend and these are always on his lips when an explanation of the ritual is solicited. 'We cling to the rites of our ancestors because they have been pronounced good by those who know. We erect altars, sing our traditional songs and celebrate our sacred dances for rain that our corn may germinate and yield abundant harvest.'"

LIVE SNAKES AT CLIMAX

The Snake-Antelope ceremonial has achieved a special fame because of its climax—the Snake Dance—in which the Hopi Snake Priests dance with live snakes, which they regard as sacred messengers to the gods of the underworld. About one-third of these snakes are poisonous. The dance is performed in the plaza of the village and can be witnessed by spectators, most of whom are neighboring Navahos and vacationists.

Preparation for the dance begins on the fourth day of the ceremonial, the first three being taken up with rites in the kivas, when the priests start out on the ritualistic snake hunt. Each day of the next four days the priests hunt snakes in a different "world-quarter" or cardinal direction, always following the sequence of north the first day, west the second, south the third, and east the fourth. They pursue their search with great intensity, and at least one anthropologist who wanted to witness the catching of a snake, for the sake of science and his own curiosity, had to give up the chase and drop behind.

As Dr. Laurence M. Klauber, herpetologist of San Diego, reports, three kinds of snakes are caught: the poisonous prairie rattlesnake and the nonpoisonous Great Basin striped racer and Arizona gopher snake. If the priests are unsuccessful in catching enough snakes—about fifty to seventy-five are used in the ceremony—the hunt may be prolonged for an extra day or two, the searchers then being free to hunt in any direction they wish.

At noon of the ninth day the snake-washing or "baptism" takes place with great secrecy in the kivas. This rite, the significance of which has never been completely explained, consists mainly in passing the snakes through a solution of yucca suds that have been consecrated in a previous ritual. After a snake is "washed" it is dropped on a field of sand to dry and allowed to crawl freely for as long as two hours. Young boys with snake wands herd the snakes—most of which show no respect for the boundaries within which they are supposed to stay—back into the field of sand.

At sundown before the dance the snakes are placed in bags in the *kisi*, a shelter of cottonwood branches that is put up much in the shape of a teepee in the center of the village plaza. The entrance to the kisi is closed off with a cloth. It is through this opening that the dancers receive the snakes from a priest who secretes himself within. In front of the shelter is a hollow, covered by a board, that represents the *sipapu* or sacred hole from which the Hopis believe life first emerged from the underworld.

PRIESTS GO INTO DANCE

By the time the dance is ready to begin, Hopi rooftops and doorways are filled with spectators whom the Hopis usually tolerate more than they welcome. The dance begins when the Antelope Priests enter the plaza. Dressed in loin cloths, their bodies streaked with white paint, rattles of tortoise shell tied to their knees, chanting and whirling their bull-roarers, they make a circuit of the area in a shuffling kind of dance. As they pass the sipapu they stamp on it to notify the gods that the dance has begun. After making four circuits of the plaza they line up in single rows on each side of the kisi, keeping up a continuous chanting and rattling.

The Snake Priests then enter and dance around the area much as the Antelope Priests did. After circling the plaza four times they break off into groups of three. One of the men of each trio, the carrier, dances away from his partners and approaches the kisi. Stooping over, he reaches into the opening and is handed a snake, which he places in his mouth, holding it with his lips and teeth about six inches to a foot behind its head. The second man of the trio puts his hand on the right shoulder

(*Continued on page 5, column 2*)

'FINGERPRINT' CLUES IN THE QUEST FOR OIL

By EUGENE S. RICHARDSON, Jr.
CURATOR OF FOSSIL INVERTEBRATES

FOSSIL INVERTEBRATES and plants fill fifty-three exhibition cases in Frederick J.V. Skiff Hall (Hall 37), but only one of these cases indicates that fossils have any economic importance. It should not be deduced from this, however, that fossils are unimportant to the world of commerce.

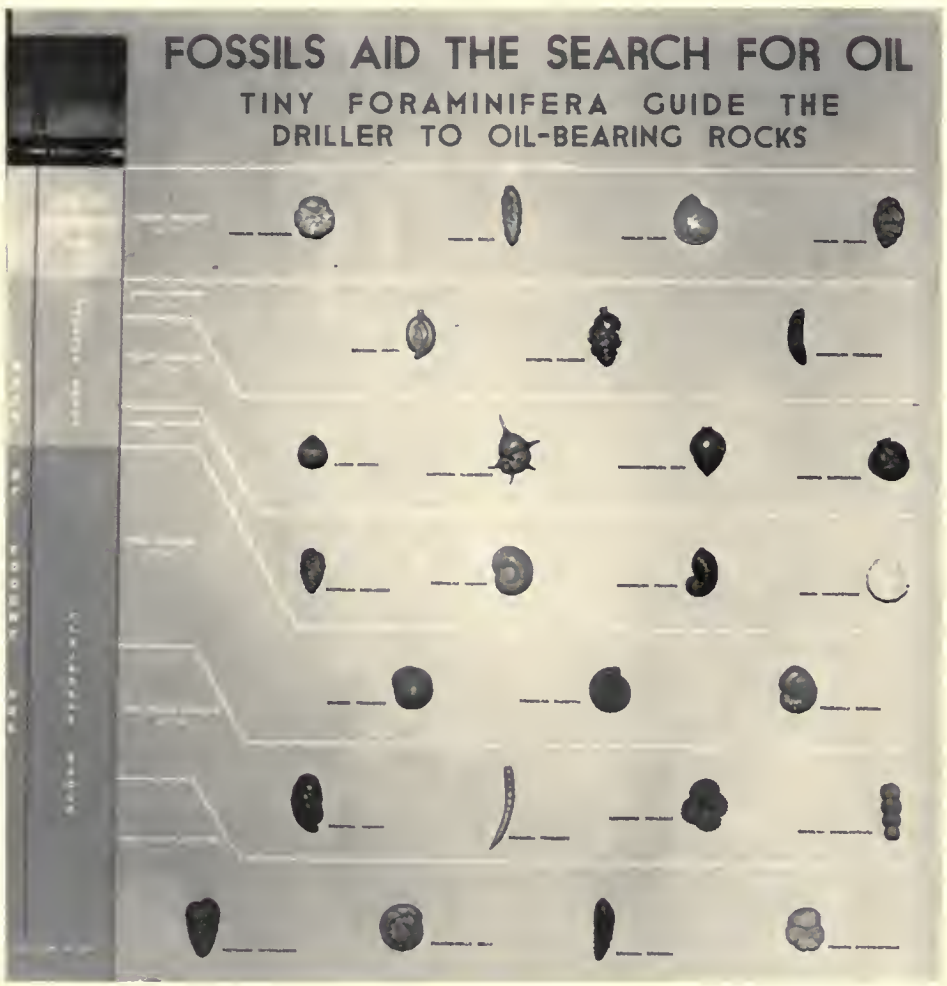

EXHIBIT IN FREDERICK J. V. SKIFF HALL OF INVERTEBRATE PALEONTOLOGY

On a small scale, fossils are occasional items of sale, and a handful of dealers in many parts of the world maintain a successful trade in these recondite objects. But the vital importance of the minute fossil invertebrates lies in the mute but active role they play in one of our biggest industries—the oil business. Every day the churning drill-bits sunk into oil wells grind their way down into the earth's crust beneath Texas, Saudi Arabia, Alberta, and many other oil-yielding terrains. When the heavy steel-tipped drills grind away as far as three miles underground, a current of muddy water circulating through the hole cools the bit and at the same time flushes to the ground surface the pieces of rock broken in the process. Usually this muddy water trickles into a settling pond made for the purpose by a bulldozer, and there the mineral fragments are allowed to come to rest before the clear water is restored to the nearest natural stream.

THOUSANDS BROUGHT UP

Any fossils of good size in the ground-up rock are, of course, completely ruined by such severe methods, but nevertheless thousands of fossils do manage to escape and to come up with the mud. These are the so-called microfossils—the tiny fossils so small that they must be studied with a microscope. They escape the destructive action of the drill in the same way that an ant escapes being crushed on rough ground by the shoe of a passer-by: being smaller than the fragments of rock, they are hidden behind them and are thus protected.

Having been knocked out of the enclosing sand or shale or other rock in which they were imbedded millions of years ago when the rock was being deposited under a vanished sea, the little fossils are flushed to the surface with the debris of their former hiding place. Once arrived at the surface, they are immediately put to work. Before the muddy water gets to the settling pond, a geologist pounces on it and scoops up a handful of sediment. While far below him the drill is still pounding away, the geologist sets to work to examine his prize. First he dries it, often by the fire of the very forge that keeps the driller's tools sharp; then he spreads it in a thin layer on a sheet of paper under a stereoscopic microscope. The tiny fossils show up clearly among the sand grains in his field of view, and if he has become familiar with the micro-fossils of his particular oil field, the geologist can readily recognize them by name.

But recognizing the microfossils by name is only the beginning, for the geologist is a practical oil man and is not employed to make an interesting fossil collection. The oil company has hired him to keep a record of the slants, folds and taperings of the beds under the surface, so that he may guide the driller in approaching the oil they hope to strike. If oil has been found at a depth of 10,528 feet in a certain well, it unfortunately does not follow that the "black gold" will also be found at that same depth in a new well half a mile away. Oil-bearing beds are subject to the same earth forces that produce folded or faulted mountain ranges, and they also exhibit changes in texture from place to place, according to the conditions under which they were deposited. Thus the second well might encounter the same bed that produced oil in the first well, but in the second location the bed might be non-porous. In that case the driller, not yet having found the oil he was seeking, would keep right on drilling, at a prodigious cost per foot, unless the geologist told him to give up and try another location. Or the driller might find that he had passed the 10,528-foot depth without finding oil, and would want to abandon the well. The geologist might then tell him to keep on drilling because the oil level was yet to come.

LIKE FINGERPRINT CLUES

All of this determination from subterranean clues of the course that should be followed is possible because geologists have long recognized that each bed of sedimentary rock is characterized by a special assemblage of fossils which are often as unmistakable and tale-telling as a fingerprint in detective work. In the exhibit illustrating the importance of fossils in the search for oil, enlarged models of microscopic fossils show a few of the species commonly found in certain beds beneath the surface of the Gulf Coast. These make it apparent that a trained observer can recognize a sample before him as having come from, for example, the Yegua formation rather than the overlying Caddell formation or the underlying Cook Mountain formation.

The fossils shown in this exhibit are Foraminifera (forams), the most important

of the microfossils; a few other kinds are shown under a small magnifying glass in the lower right corner of the case. Foraminifera are one-celled animals related to the amoebas and paramecia commonly demonstrated in pond-water samples in elementary biology courses. But the Foraminifera are fancier than these more familar forms, for they have little shells of varied shape, built of a succession of tiny chambers, each larger than the last, and often highly ornamented, though the entire shell is no larger than the head of a pin.

With such a variety of form, it is easy to recognize many different species of Foraminifera, but even so, no one could be expected to be familar with all of them by sight. The standard reference catalogue of the Foraminifera fills a bookshelf all by itself —it consists of forty large volumes of more than 1,000 pages each, with a different species of Foraminifera on each page.

CERTAIN SPECIES PROVIDE KEY

Therefore the geologist at the well is not expected to know and record the entire fauna of each bed of rock penetrated in the drilling. He is there to watch for certain key beds, such as the one just above the oil, the oil-bearing bed itself, and the one just below it; he has primed himself on the fossils to be expected in those beds. So, in addition to the sample that the geologist at the well examines, the driller puts a sample of the mud in a little cotton bag from time to time, and these samples are sent to the company laboratory. Actually, the best samples are not taken from the "soup" that spills from the mouth of the hole during the drilling, but are taken by bailing when the drill stops periodically for sharpening. There is danger of contamination of the sample in the muddy water rising along the side of the well; fossils from higher levels are often swept along with those from the bottom. But the bailer takes the fossil-bearing debris only from the bottom of the well, where the fossils are in their natural level of occurrence.

MODELS OF MICROSCOPIC FORAMS

These tiny fossils, almost invisible to the naked eye, are exhibited in enlarged models as though seen under a high-powered lens. In the illustration four genera are shown, about 40 times larger than life-size. They are: Marginulina (upper left); Uvigerina (upper right); Globigerina (lower left) and Cornuspira (lower right). The enlarged sculptures were made by Museum Artist Joseph B. Krstolich.

Because of the importance to the industry of these guide fossils, it is natural that the largest collections of Foraminifera should be in oil company laboratories, where they are constantly used for reference with the new ones sent in daily. A general museum, such as Chicago Natural History Museum, does not need a large collection of these interesting fossils, and indeed, if we attempted to assemble one, it would be necessary to form a separate unit of the staff and the Library to handle them, because the study of Foraminifera is a subject that calls for specialists.

HOPI SNAKE RITUAL—

(*Continued from page 3*)

of the carrier and together they go through a dance. The hugger, as this man is called, intermittently strokes with a feathered wand the snake dangling from the carrier's mouth. Supposedly this stroking soothes the snake and serves to dissuade it from any designs it may have on the carrier.

After the snake is properly danced the priest drops it from his mouth to the ground and returns to the kisi for another. The third man of the trio—the gatherer—picks up the snake in a very leisurely fashion, letting it crawl freely for a few seconds before he quells the growing fears of the audience by capturing it. When a gatherer has accumulated a number of snakes he hands several of them to an Antelope Priest, holding as many as he can himself.

After the priests have danced with all of the snakes, a circle is drawn on the ground and the men holding the snakes drop them in a pile within the circle's boundaries. Then, as the snakes are beginning to untangle themselves from their fellow creatures and crawl for freedom, the Snake Priests rush toward the circle, gathering in their hands as many snakes as they can hold. With the snakes in their hands they run from the plaza, streaking across the mesa to the plains below. Here they release the snakes, entrusting them to carry to the gods their prayers for rain.

Although this is the end of the dance as far as the spectators are concerned the Hopis have still another rite to perform. The priests remove all their ceremonial garb and gather at the edge of the mesa. Here they are met by women who bring a medicine brewed in great secrecy. The priests drink the medicine, which acts as an emetic and which some people say, erroneously, rids them of snake poison. After this rite, which they perform with painful thoroughness, they are ready for the less solemn part of the ceremonial—a four-day feast in which all Hopis take part.

IMMUNITY A MYSTERY

As the Hopis prepare for their festivities the spectators wind their way out of the village to their cars or camps or, if they are Navahos, to their neighboring settlements, the sight of the strange dance still fresh in their minds. Many undoubtedly will try to fathom how the Hopis handle the poisonous snakes with apparent immunity, the reported instances of snake-bite among the priests being exceedingly few.

Many theories have been advanced to explain this phenomenon, some by experts and others by laymen. Dr. Klauber made an extensive study of the Snake Dance, in which he cited as many as twenty-nine of these theories. Many of them were fantastic, based either on wrong facts or superstitions, such as the theory that the priests have a hypnotic power over the snakes akin to the power said to be possessed by the snake-charmers of India, or the idea held by some observers that the priests cover their bodies with an invulnerable preparation, as, for instance, a thick paint. Klauber's own conclusion is that the snakes are milked of their venom or allowed to strike so many objects in the kiva that there is little poison left with which they could harm their handlers.

Another theory believed valid by some herpetologists is that the rattlers have been defanged, either in the kiva or when they are caught. Charles Bogert, Curator of Reptiles at the American Museum of Natural History, managed to catch a rattler after it was released by a priest. After studying the snake, Bogert reported that both its functional and reserve fangs had been cut out with a sharp instrument. But only one such snake has been found. Whether the Hopis of this village remove the fangs of most or all of the rattlers used in the ceremonial, whether this practice is fairly recent, or whether other villages engage in it is not known. One can only speculate unless more evidence becomes available.

Only the Hopis do not ask questions. While the scientific observers take notes and ruminate upon their observations, the Hopis enact their nine-day ritual of faith. Resisting all attempts of local townspeople to make a commercial venture out of their ceremonial and resentful of any phony imitation of their dance, they simply watch the wide heavens above their villages. If the gods take heed of their prayers, rain will fall, and life will go on for another year in the villages where they have managed to build a culture that, like the desert that is its home, has weathered the passage of centuries.

FRESHWATER JELLYFISH SENSATION DEFLATED

An extraordinary being, a freshwater jellyfish, was recently discovered in Maple Lake, Palos Park, Illinois, according to newspaper reports. Contrary to the press accounts, however, this little animal is not very rare, for it has been repeatedly found both in Illinois and in neighboring Indiana as well as in other states. In Europe, it has been reported from many places, and is found in rivers, ponds, hot-house tanks,

FRESHWATER JELLYFISH

Specimen of Craspedacusta sowerbyi obtained by a Museum collecting party near Bloomington, Indiana. It was found in an abandoned limestone quarry in which about ten feet of water had accumulated.

and so on. Originally, this strange creature had been discovered in Lake Tanganyika in Central Africa and, later, among other localities, in the Yang-tze River in China.

It has since been introduced, by means still unknown, to almost all countries, and it thrives everywhere, although only during the hottest season. At that time of the year, the sexual individuals, i.e., the jellyfish in its floating phase, develop from an asexual stage, called a polyp, a being so tiny that it is usually overlooked. When the young, free-swimming jellyfish detach themselves from this polyp, they are only about one-sixteenth of an inch in diameter. Gradually, in the warmed-up water of their habitat, they grow and, when fully mature sexually, they may attain a diameter of almost one inch. Their life-span is short, and they soon disappear after they have reached their maximal size.

Two Lecture Tours Daily Offered in August

During August, lecture tours of Museum exhibits will be offered in both the mornings and the afternoons of weekdays, Mondays through Fridays inclusive; on Saturdays and Sundays tours will be omitted.

Except on Thursdays, the morning tours will be devoted to the exhibits in one specific department. The afternoon tours (and Thursday morning) will be comprehensive in scope, touching on outstanding exhibits in all departments. Following is the schedule that will be followed weekly:

Mondays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—Records from the Rocks
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—Animals Around the World
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits

Books

(The book reviewed below is available by mail order through The Book Shop of the Museum. Remittance should accompany order; price quoted includes postage.)

JOURNAL OF RESEARCHES into the Geology and Natural History of the Various Countries Visited by H. M. S. Beagle. By Charles Darwin. Facsimile reprint of the first edition. Hafner Publishing Company, New York. xiv+615+21 pages, 16 plates. Price $7.50.

Darwin's *Journal of Researches,* often referred to under the title "A Naturalist's Voyage Around the World," is a work of extreme importance to the history of biology. It has long had wide distribution and wide popularity, through many editions, as a travel book. The value of the very rarely available first edition has risen to $100 or more, and the better illustrated editions appear to be available only at second hand. Thus travelers, book-lovers, historians of science, and scientists themselves are indebted to the active mind of Dr. Franz Verdoorn for the choice of this volume for reprinting in the facsimile series "Pallas."

The importance of Darwin's book is manifold. It is the most invaluable historic record of the impact of travel and first-hand observation on the unfolding mind of a young man who was to become one of the very greatest of scientists. And it remains a vivid book of travel, especially for its extended account of South American scenes, to which 469 of the more than 600 pages of text are devoted. Darwin visited Brazil, Uruguay, the Argentine plains, Patagonia, Tierra del Fuego, the wet forests of southern Chile, the extreme desert of the northern Chilean coast and the coast of Peru, and the extraordinary Galapagos Islands. It was in the Galapagos, especially, that he fell to speculating on the very origin of species that gave title to his revolutionary volume of 1859. Darwin's curious but quite understandable misinterpretation of the Fuegian Indians has only lately been cleared up (Esteban Lucas Bridges, *The Uttermost Part of the Earth,* 1949).

Observations in the South Seas led to an important volume on *The Structure and Distribution of Coral Reefs,* a subject that continues to occupy geologists and physiographers to the present day. The glimpses of the colonies of New Zealand and Australia more than a century ago are of especial interest, as is his account of his own reactions to the slave-holding society of Brazil.

The perspective of time has increased rather than lessened the importance of Charles Darwin in the history of biology. In recent years two important additions have been made to the understanding of the growth of his ideas during the voyage of the *Beagle.* These are the publication in 1933 of the diary kept by Darwin on the voyage and the appearance of a volume of extracts from his notebooks and from family letters written by him during his absence, published by his granddaughter, Nora Barlow, in 1946. The facsimile of the first edition now made available completes this series from notebooks to diary to the complete *Journal.*

It has been the good fortune of a number of members of the staff of Chicago Natural History Museum to travel on Darwin's trail in Uruguay, in Tierra del Fuego, on Chiloe Island, in the Galapagos, and on Tahiti. Our observations and collections from these regions were to amplify and extend the work that grew out of Darwin's pioneer collecting and to bring a representation of the fossils and of the animal species collected by Darwin to this Museum. With the *Journal of Researches* at hand, the earlier presence of the young Darwin lent a romantic glamor to these regions.

We can all attest to the value of Darwin's advice on the last pages of the *Journal:* "In conclusion, it appears to me that nothing can be more improving to a young naturalist, than a journey to distant countries. It both sharpens, and partly likewise allays that want and craving, which . . . a man experiences although every corporeal sense is fully satisfied. The excitement from the novelty of objects, and the chance of success, stimulate him to increased activity. Moreover as a number of isolated facts soon become uninteresting, the habit of comparison leads to generalization. . . . I have too deeply enjoyed the voyage, not to recommend any naturalist . . . to take any chances, and to start, on travels by land, if possible, if otherwise on a long voyage."

KARL P. SCHMIDT
Chief Curator of Zoology

PAWNEE CONCEPT OF ETERNITY: 'SOUL VILLAGES' IN SKY

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

JUST WHAT is the religion of an American Indian tribe like? To what extent does it parallel the better-known and more formalized religions of the world?

A unique example is that of the Pawnee, many of whose religious concepts are portrayed visually in a Museum exhibit entitled "Pawnee Ideas of Life After Death." This graphic outline of what the Indians believed may be seen in Case No. 52 in the east half of Mary D. Sturges Hall (Hall 5).

The Pawnee Indians formerly lived in a number of towns along the Loupe and Platte Rivers in Nebraska. In the early 19th century there were more than 10,000 Pawnee living in villages of large earth-covered lodges each of which housed a large family and relatives related through the female line. In their prairie and river valley environment, the Pawnee made their living by farming and hunting the buffalo. Crops raised were corn, beans and squash.

Pawnee religious concepts were relatively elaborate. They deified the cosmic forces and the heavenly bodies. Their supreme power was called Tirawa, and the heavenly bodies, the winds, thunder, lightning, and rain were his messengers. All of the deities and supernatural forces were propitiated by rituals and ceremonies that were directed by members of the Pawnee priesthoods. By means of these rituals and ceremonies the supernatural powers were believed to endow the Pawnee with food, long life, and prosperity.

The Pawnee believed in life after death, but life after death was not the same for everybody. For instance, the souls of chiefs and priests were believed to travel along a pathway of flowers to a special soul village in the sky whereas the souls of ordinary people followed the milky way to the abode of the South Star Goddess. The souls of medicine men were believed to wander over the hills to their special soul village in the sky. Warriors, too, had their special soul village in another part of the heavens.

The soul of the maiden sacrificed for the well-being of the Pawnee in the Morning Star ceremony was believed to become one of the wives of the Morning Star God. However, Pawnee priests failing to fulfill properly the sacrifice to the Morning Star God became burning flint under his feet.

PAWNEE INDIANS' IDEAS OF LIFE AFTER DEATH SUMMARIZED IN EXHIBIT BY MUSEUM ARTIST GUSTAF DALSTROM

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 34, No. 23. *Some Mammals of Yemen and Their Ectoparasites.* By Colin Campbell Sanborn and Harry Hoogstraal. 24 pages. $.35

Fieldiana: Anthropology, Vol. 41. *Saipan, The Ethnology of a War-Devastated Island.* By Alexander Spoehr. February 11, 1954. 384 pages. $5.

Fieldiana: Geology, Vol. 10, No. 16. *Freshwater Limestone from the Torola Valley, Northeastern El Salvador.* By Sharat K. Roy and Robert K. Wyant. $.50

Fieldiana: Zoology, Vol. 36, No. 1. *The Social Feeding Behavior of Birds.* By Austin L. Rand. March 10, 1954. 72 pages. $1.

Fieldiana: Anthropology, Vol. 42. *Caves of the Reserve Area, New Mexico.* By Paul S. Martin, John B. Rinaldo, Elaine Bluhm. June 11, 1954. 228 pages. $5.

CHIEF CURATOR ROY BACK FROM VOLCANO STUDIES

Bringing specimens of volcanic products from Izalco, one of the world's most active volcanoes, and important data resulting from his observations, Dr. Sharat K. Roy, Chief Curator of Geology, has returned to the Museum from an expedition to El Salvador. He had been in the field since March, and made collections also at four other major volcanoes. Volcan Izalco has been erupting ever since it was born in 1770 and has discharged more lava than any other volcano of its kind and age. It has built itself up to a height of about 6,000 feet. Chief Curator Roy climbed this volcano on a previous expedition in August, 1951. At the present time Izalco is erupting every three to five minutes, often so violently that it would be suicidal to attempt to reach the crater.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received recently:

Department of Anthropology:

From: Byron Harvey III, Chicago—dance kilt (Jemez), New Mexico

Department of Botany:

From: Academy of Natural Sciences of Philadelphia—seeds of Scrophulariaceae; Holly R. Bennett, Chicago—462 phanerogams, Illinois and Indiana; Dr. Henry Field, Coconut Grove, Fla.—109 phanerogams; Florists Publishing Co., Chicago—Hedera canariensis var. Canary Cream; Harvard University—14 plants, Colombia; Byron Harvey III, Chicago—Knautia arvensis, New York; Instituto Botanico, Caracas, Venezuela—Ilex; Morton Arboretum, Lisle, Ill.—Vincetoxicum officinale; New York Botanical Garden—seeds of Scrophulariaceae; Dr. J. W. Thieret, Chicago—43 plants, Cuba and Chicago; U. S. National Museum, Washington, D. C.—seeds of Scrophulariaceae

Department of Geology:

From: Dan Kreutzer, Chicago, and John Cutler, Cincinnati—slab and 6 specimens of *Glyptocrinus dyeri*, Dent, Ohio

Department of Zoology:

From: Chicago Academy of Sciences—paratypes of mites; Chicago Zoological Society, Brookfield, Ill.—Siberian tiger and mata-mata turtle; William J. Gerhard, Chicago—collection of Hemiptera, chiefly North American, and 319 bees and wasps; Dr. W. D. Klimstra, Carbondale, Ill.—dorsal spine of fish; Mrs. Arthur McElhose, Arlington Heights, Ill.—4 worm-lizards; Raffles Museum and Library, Singapore—3 snakes, Sarawak, Malay Peninsula; Karl P. Schmidt, Homewood, Ill.—21 frogs and 2 lizards, India; Dr. Jeanne S. Schwengel, Scarsdale, N. Y.—collection of land shells, Cuba; Bernard Sugerman, Santurce, Puerto Rico—100 insects, Philippines; Laura Brodie, Chicago—snake (Natrix), South Carolina; Roland von Hentig—11 frogs, 5 lizards, 5 snakes, Java, Borneo, Sumatra, and 11 fishes, Indonesia, Nunukan; Museo Nacional de Historia Natural, Santiago, Chile—13 frogs

STAFF NOTES

Robert K. Wyant, Curator of Economic Geology, spent July in the iron ranges of Minnesota and Michigan studying the future economic possibilities of taconite, a low-grade iron ore, and collecting specimens for the Museum .... **Dr. Austin L. Rand,** Curator of Birds, recently made studies of the feeding habits of the wood ibis at the Florida Biological Station at Lake Placid and has completed a paper on the subject .... **Miss Katharine Williams,** of Hollywood, Florida, a recent graduate of Rosary College, River Forest, Illinois, has been appointed Reference Librarian. She replaces **Miss Jane Ross,** who has resigned to teach in schools maintained for children of American military personnel in Germany .... "Identification of Trees" was the subject of a recent lecture by **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, before the Barrington Natural History Society.

NEW MEMBERS

The following persons became Museum Members from June 16 to July 15:

Non-Resident Life Member

Miss Lissa Fowler

Associate Members

Robert Crown, Otis L. Jones, D. P. Loomis, Mrs. Rollin D. Wood

Sustaining Members

George A. Duclos, A. J. Jacobson, Karl K. Minas

Annual Members

Dean S. Barnard, George R. Baxter, Leslie A. Brandt, John L. Burroughs, Dr. Walter W. Carroll, Harry J. Chidley, H. L. Curwen, F. J. Durham, Mrs. Dorothy Mylrea Ebin, Fred W. Eckert, James F. Flanagan, Jones B. Frankel, Charles A. Freeman, Jr., Mrs. Alice Goodrich, Frank D. Gorsline, Andre B. Hafner, Robert F. Halligan, John Harrington, Dr. Hyman J. Hirshfield, Jack Hollander, T. J. Isaacs, R. O. Ives, Arent J. Jacobson, Robert Kaiser, Joseph J. Kass, Mrs. Spencer R. Keare, Claude M. Lambe, Jr., Mrs. M. K. Lau, J. D. Larkin, Herbert A. Loeb, Jr., F. L. Majka, Edward D. Matz, Daniel P. McMahon, Richard L. Merrick, Walter B. Mills, Miss Elizabeth W. Morgan, Mrs. Ruth Moore, Charles F. Murphy, Joseph Nathan, Elmer G. Norell, Ross A. Norris, Lorry R. Northrup, Dr. Carl O. Rinder, Leonard M. Ring, Frederick Roe, Dr. David H. Rosenberg, Sol Sackheim, M. L. Shipley, Frederick J. Slater, A. Thomas Steele, Karl E. Stein, C. J. Stind, Mrs. Frank L. Sulzberger, R. S. Sustman, Mrs. F. Thomas, W. F. Wilmas, R. B. Whitaker, Albert M. Wolf, Gar W. Yates

2 MORE MOVIE-PROGRAMS OFFERED FOR CHILDREN

Two more free Thursday-morning programs of movies for children in the Summer Series remain to be given in August. Each program will have two showings, one at 10 A.M. and one at 11 A.M., in the James Simpson Theatre of the Museum. Dates and titles are:

August 5—KANGAROO LAND
Also a cartoon

August 12—VACATION COUNTRY
Carlsbad Caverns, Grand Canyon, and the Rockies
Also a cartoon

These entertainments are provided by the James Nelson and Anna Louise Raymond Foundation. No tickets are required. Children may come alone, accompanied by adults, or in groups.

PHONOGRAPH RECORDS

MUSIC AND BIRD SONGS. Sounds from nature with commentary and analysis. A phonograph record produced by P. P. Kellogg and James H. Fassett. Comstock Publishing Associates, Ithaca, New York. Price $5

With comment by James H. Fassett, songs and calls of ten birds and six frogs are reproduced on this record, first at normal speed, then slowed down, some as much as to one-eighth of normal. The effects are certainly different, sometimes weird, sometimes beautiful. It was interesting to me to note that the rapid, tinkling, trilling song of the winter wren, when slowed down, recalled in part the slow, hollow, hooting song of certain Central American wrens. This bird and frog program was first presented on a radio broadcast as an intermission feature of a New York Philharmonic Orchestra concert on May 25, 1952, and was so popular that parts of it were repeated, and now this 33⅓ r.p.m. record has been made.

Bird recordings have gone forward with presentations such as this. We listened to the first recordings, marveling that they sounded like birds. Then we got them for enjoyment of the sounds of nature at home or as an aid in learning or teaching. An ecological concept, groupings by habitat, was the usual unity involved. Now, with the maturing of the idea and techniques, we have an attempt to make these recordings part of our general culture and consciousness—to take them out of the "nature-lover's" class and fit them into our general knowledge and background.

AUSTIN L. RAND
Curator of Birds

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 9 - September 1954
Chicago Natural History Museum

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

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Members are requested to inform the Museum promptly of changes of address.

The Strange Case of

THE 'FLYING LOBSTER'

BY FRITZ HAAS

CURATOR OF LOWER INVERTEBRATES

One day last month a Chicago daily newspaper consulted the Museum on a report that a "lobster" had been dropped from the sky into Waukegan, Illinois, during a violent rain-and-hail storm. A nature lover in that city was said to have made a test that "proved" to his satisfaction that the creature in question was a "salt-water lobster." However, the little animal that dropped from the sky was brought to the Museum where it was identified as a fresh-water inhabitant—a young specimen of one of our commonest crawfishes. It is of a species that abounds in our rivers, creeks, ponds, and even in shallow areas of Lake Michigan.

This issue being cleared up, it remained to be determined if the crawfish really was dropped into the Waukegan street by a rainstorm. This, it must be conceded, is perfectly possible because quite a few similar cases are known. An authentic instance is recorded of a multitude of fresh-water clams being dropped by a tornado into a town some miles distant from the ponds where the clams had lived. At least seven equally well documented cases of a "fish rain" have been reported from South Carolina and India. Therefore there is nothing to prohibit us from believing that the "flying" crawfish may have been removed from shallow water somewhere near Waukegan by a strong gust of wind, carried through the air as long as the gust lasted, and dropped when the wind's violence lessened.

There are other strange phenomena that folklore associates with rainfall, although they are not directly caused by it. For example, there is the so-called "frog rain"—the sudden appearance of innumerable tiny frogs or toads after a heavy rain. These animals do not rain from the sky, of course, but are lured out of their hiding places by the cool wetness following the rain. Then there is the "blood rain" or sudden appearance in fresh puddles of a blood-red color that has given rise to many superstitions. The red color is caused, however, by the quick growth of unicellular organisms, mostly of the microscopic alga *Sphaerella pluvialis*, after dry spots, where their spores were lying, have been flooded.

THIS MONTH'S COVER

The statue of a woman holding a child and a book of learning, a sculpture by Henry Hering called "Dissemination of Knowledge," symbolizes one of the four principal purposes of the Museum. It is one of four statues in Stanley Field Hall that flank the north and south archways. The others are "Natural Science," "Research," and "Record." Hering, a New York sculptor, well known since the 1890's, was commissioned at the time of construction of the present building to express, in these heroic figures that blend with the architecture, the aims of the Museum. He is the author also of many monuments and other sculptural works that dot bridge pylons and buildings elsewhere in Chicago and other cities. This photograph was made by the Museum's Division of Photography.

STAFF NOTES

John W. Moyer, who has been on leave of absence from the Museum for more than two years while serving as Consul of the United States in India, has returned to his studio here as head of the Division of Motion Pictures.... **Bryan Patterson,** Curator of Fossil Mammals, has left for Argentina where, under the recent grant of his second Guggenheim Foundation fellowship, he will continue a paleontological research project initiated several years ago.... **D. Dwight Davis,** Curator of Vertebrate Anatomy, has returned to the Museum after a six-month leave of absence during which he served as a visiting professor at California Institute of Technology in Pasadena.... **Rupert L. Wenzel,** Curator of Insects, has returned from a 10,000-mile field and study trip to the West. For about eight weeks he collected histerid beetles and other insects at some seventy localities in the Southwest, along the Pacific Coast, and in the Pacific Northwest.

National Science Foundation Grant to Entomologist

A National Science Foundation grant has been awarded to Dr. Charles H. Seevers, Research Associate in the Museum's Division of Insects, to help subsidize his studies on the classification of the beetles of the family Staphylinidae. Dr. Seevers, who is chairman of the department of biology at Roosevelt College, will spend six months during each of the next two years studying important collections both in this country and Europe to supplement his current research on this Museum's notable Max Bernhauer Collection acquired in Austria in 1951. He will revise the generic classification of the largest and least-known subfamily, the *Aleocharinae*. Dr. Seevers, who is known best to entomologists for his studies on the Staphylinidae that live with termites, recently completed a world monograph, scheduled for publication by the Museum, on the classification and evolution of these beetles.

Museum Aids Science on TV

Chicago Natural History Museum furnished the "props"—anthropological specimens from various parts of the world—for the nationally telecast program "What in the World?" (CBS), originating in the University of Pennsylvania Museum in Philadelphia, on August 8. Several of the objects shown "stumped" the members of the panel, well-known scientists who by deductive methods attempt to identify their origin and purpose.

Museum Pensioner Dies

The death on August 18 of Valerie Legault, veteran former Museum employee, is recorded with regret. Mr. Legault, who was born in 1865, worked here from 1906 until his retirement on pension in 1940, first as a carpenter and later in the N. W. Harris Public School Extension and the Department of Geology.

DISCOVERED: A POSSIBLE TECUMSEH PORTRAIT

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE MUSEUM'S COLLECTION of portraits of Indians painted more than one hundred years ago includes one picture that may be a likeness of Tecumseh, the famous Shawnee chief. If sufficient substantiating data should be obtained, the painting would acquire historical importance, because no authenticated portrait of Tecumseh has ever been brought to light.

Tecumseh, said by one historian to have been the most extraordinary Indian character in United States history, was born in Ohio about 1770. As a leader and statesman among the Indians of the frontier, he attempted to establish the principle that the land in the Ohio Valley and the Northwest Territory belonged to all of the Indian tribes and therefore no single tribe had the right to sell land or enter into land agreements with the governments of white men. In defense of this principle he tried to organize all of the middle-western and southern tribes into a great confederacy and also engaged in various of the border wars that resulted from the encroachment of white settlers on the Indian lands.

DIED IN BATTLE

At the beginning of the War of 1812, Tecumseh put himself and his Indian forces at the disposal of the British. He was given a regular commission as a brigadier-general in the British army and commanded some two thousand warriors of the allied tribes. Tecumseh died in battle on October 5, 1813, when General William Henry Harrison defeated the British and Indian forces in southern Ontario.

Although no true portrait of Tecumseh is known to exist, one generally given as such is a composite based on a pencil sketch made about 1808 (by Pierre Le Dru, a French trader at Vincennes). To this, about fifty years later, were added Tecumseh's cap, medal, and brigadier-general's uniform.

The Museum's portrait, possibly of Tecumseh, was included in a collection of paintings obtained in 1894. This collection also contained 35 paintings by George Catlin and a portrait probably by Chester Harding.

All of these paintings were purchased from Miss Emily O'Fallon of St. Louis who was a grandniece of General William Clark and his brother, General George Rogers Clark. Her father, Major Benjamin O'Fallon, served for many years as Indian agent under his uncle, General William Clark, who was superintendent of Indian affairs for the western regions and governor of Missouri territory. General William Clark encouraged and sponsored artists coming to the frontier to paint Indians and also collected paintings of Indians. So did Major O'Fallon. Moreover, paintings from both the O'Fallon and Clark households could have been in the collection obtained by the Museum from Miss Emily O'Fallon in 1894.

Consequently, since both William and George Rogers Clark had fought against Tecumseh and would have had ample opportunity for contact with him and since William Clark was a collector of Indian

TECUMSEH?

An authenticated portrait of the extraordinary Shawnee chief who lived about 1770-1813 has been lacking in all known American historical archives. However, considerable evidence indicates that the painting reproduced above (artist unknown), now in a collection at the Museum, may portray the famed Indian warrior and statesman.

portraits, it is not unlikely that there would have been a portrait of Tecumseh in the Clark-O'Fallon collection. In fact, Miss Emily O'Fallon in her correspondence with the Museum in 1894 stated that one of the portraits was of Tecumseh. However, she neglected to say which portrait. She also wrote that the work of Chester Harding was represented in the collection.

Neither Catlin nor Harding could have painted a portrait of Tecumseh because he died before they became painters. With the Harding and Catlin paintings thus eliminated, the remaining painting in the collection must be the Tecumseh portrait mentioned by Miss O'Fallon. This is an oil painting about 23 inches wide and 28 inches high. It portrays an Indian wearing the clothing of white men.

There are a number of points of resemblance between the subject of this portrait and the sketch of Tecumseh made by Pierre Le Dru about 1808. In short, comparison of the two pictures suggests that the Museum's portrait could be of Tecumseh. Perhaps there will be available some day sufficient data to prove the identity of the subject. But until that time and in accordance with what data are available, we can only say that the Museum is in possession of a portrait, possibly of Tecumseh, painted by an unidentified artist not later than 1813.

MUSEUM MEMBERS' NIGHT SET FOR OCTOBER 8

MEMBERS of the Museum are urged to make a notation—*now*—on their calendar pads or in their date books: **Friday evening, October 8—Museum Members' Night, 7 to 10:30.**

This annual event enables Members to review the current work of the staff, to see recently acquired collections, and to become better acquainted generally with the Museum program that they are helping to support.

MOVIES OF AFRICAN SAFARI

One feature of the evening will be a showing in James Simpson Theatre of "Marsh Birds of the Upper Nile," the color motion-picture record of the Buchen East Africa Zoological Expedition, which was sponsored and led by Walther Buchen, a Museum Trustee, and Mrs. Buchen. Mr. Buchen in person will tell the story of the safari in Kenya Colony and Uganda. The films show the collecting of strange and magnificent birds in the great papyrus marshes of the White Nile River in Egypt and how the habitat group (which may now be seen in Hall 20 of the Museum) was constructed.

The screen show and talk will begin at 8:15 P.M.

PREVIEW OF A NEW EXHIBIT

Another feature of the evening will be the first showing in nearby William V. Kelley Hall (Asiatic Mammals, Hall 17) of a new exhibit of Malay tapirs. The specimens for this group were collected by an expedition to Siam sponsored and led by Rush Watkins, a Museum Contributor. (The exhibit will be on permanent display after Members' Night.)

A few steps away, in Stanley Field Hall, an exhibit, especially prepared for Members' Night, will emphasize the nature and extent of the entomological research conducted by this Museum and co-operating institutions. An exhibit of graphic material will be flanked by selected displays of insects.

ARCHAEOLOGICAL METHODS ILLUSTRATED

Not far off, also in Stanley Field Hall, will be another special exhibit—"The Big Dig"—telling graphically the story of how archaeologists work. This display will outline the history of twenty seasons of excavating conducted in Colorado and New Mexico by the Museum's Southwest Archaeological Expedition under the leadership of Dr. Paul S. Martin, Chief Curator of Anthropology. The methods used by the excavators will be demonstrated, and the exhibit will attempt to answer the questions of How, What, Where, When, and Why of archaeological research.

"OPEN HOUSE" IN LABS

One of the most popular features of all

(*Continued on page 5, column 1*)

MOSSES AND LIVERWORTS: OLD AND NEW USES

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

IN FORMER TIMES a person settling down for a nap might have laid his head on a pillow stuffed with certain *Hypnum* mosses, so-called because of the belief that these plants would induce slumber (the name *Hypnum* comes from the Greek "hypnos"—sleep—from which is derived the English word hypnotism). Here, then, is just one of the many uses, some important, some trivial, that man has made of bryophytes—the mosses and liverworts.

Economically, bryophytes are of slight value compared to the flowering plants. Nevertheless, some of them, particularly mosses, do possess some importance both as economic plants and as plants that often play a considerable role in nature. Those with which man is directly concerned will be considered here. Here, too, will be considered only the true mosses and not the many other things—botanical, zoological, geological, historical, and literary—that bear the name "moss." Among the "mosses" that will not concern us are reindeer moss (a lichen), Spanish moss (a flowering plant related to the pineapple), moss-carder (a bumblebee), moss agate (a mineral), moss-back (in the Civil War South, a draft dodger), *Mosses from an Old Manse* (collection of tales by Hawthorne), and the moss that the proverbial rolling stone does not gather (which probably would not be true moss anyway).

MEDICAL USES

As medicinal plants, bryophytes have received little use. Among the liverworts, the cosmopolitan *Marchantia polymorpha* has been used in the treatment of pulmonary tuberculosis and affections of the liver—but what success has been achieved seems to be unreported. In the case of the treatment of liver ailments with *Marchantia polymorpha* is seen an illustration of the curious old "Doctrine of Signatures," which taught that the medicinal uses to which plants could best be put are shown by the shape and structure of the plants. For example, a plant with heart-shaped leaves surely could be used for heart ills. Similarly, *Marchantia* plants, because of their fancied resemblance to the liver, surely would be effective in the treatment of ailments of this organ. From an old herbal (1653) comes the following statement concerning *Marchantia:* "It is a singularly good herb for all diseases of the liver, both to cool and cleanse it, and helps the inflammations in any part, and the yellow jaundice likewise."

Representatives of several moss genera have been listed as having medicinal properties. Dried sphagnum is offered for sale in various herb shops in parts of China. The whole plant is boiled in water, and the decoction is said to be used to cure acute hemorrhage and eye diseases. A tea made of *Polytrichum commune* is purported to help dissolve stones of the kidney and gall bladder. According to various writers, peat tar extracted from peat possesses antiseptic and preservative properties. Sphagnol, a distillate of peat tar, is supposed to be authoritatively recognized as useful treatment for several skin diseases and has also been recommended to relieve the itching of insect bites and even to prevent them. The

NEARLY 1,900 YEARS OLD

Unfinished basket, made from the stems of hair-cap moss (Polytrichum commune), found in Roman ruins in Great Britain. (Illustration above reproduced, by permission of the publisher, from James Curle's "A Roman Frontier Post and Its People" published in Glasgow, 1911.)

Alaska Indians make a salve, used for cuts, by mixing sphagnum leaves with tallow or other grease.

Sphagnum has far more medical importance than other mosses, mainly because of its great absorbent power (it can absorb many times its own weight of water) and its slight antiseptic properties. It has long been used for making absorbent bandages. For centuries, country people in the British Isles have used it in the treatment of boils and discharging wounds. It was at least recommended, during the Napoleonic and Franco-Prussian wars, for use by army surgeons. Sphagnum was first used surgically in a large way during the Russo-Japanese War when the Japanese used it extensively as a first-aid dressing. Indeed, it was found to make a better dressing than cotton. However, the value of sphagnum for use in surgery was apparently not fully appreciated until World War I, and by the end of the war the total British output of sphagnum dressings is estimated to have been about one million per month.

In the United States, 500,000 dressings were prepared after American Red Cross approval of sphagnum dressings in March, 1918, until the war's end in November. It is estimated that the use of sphagnum in place of cotton for dressings resulted in a saving, to the British, of not less than $200,000 per year. Perhaps equally important was the release of scarce cotton for use in explosives. During the war, the Germans were probably more active than the Allies in the utilization of sphagnum. Certain Allied prisoners of war in Germany reported that part of their work was to gather sphagnum from bogs. In World War II, sphagnum was also used surgically, but not nearly so extensively as in World War I.

PEAT MOSSES

Sphagnum and certain other mosses are largely responsible for the formation of peat. In fact, some peats consist of little else than the compressed remains of sphagnum. The bog plants that contribute to the formation of peat often include reeds, sedges, and rushes in addition to mosses. Generally these plants grow luxuriantly at the surface but die below and commence to decompose. As decomposition proceeds, the products become waterlogged and sink to the bottom of the bog. In time, the deposits attain considerable thickness, and the lower layers, under pressure of the overlying later deposits and water, are gradually compressed and carbonized.

The uses of peat are generally so well known that brief mention of some of them will suffice here. The peoples of northern Europe have made use of peat as a fuel ever since that distant time when most of their forests were cleared away. In Canada, successful attempts have been made to utilize the peat so common there. Peat fuel seems never to have been successfully produced in the United States, although rather costly attempts have been made to do so—especially after the anthracite strike of 1902–3 when people of a large section of the country were made aware of their dependence on coal miners for a fuel supply.

Among the numerous products derived by various methods from peat are charcoal, coke, illuminating gas, ethyl and methyl alcohol, ammonium sulphate, acetic acid, humic and allied acids, carbonic acid, paraffin, naphtha, pitch, montan wax, and lignins used in making plastics. Peat has been manufactured into paper, woven fabrics, and artificial wood and has been used in millboard, with clay to make porous bricks, and as a material that, when burned, makes an excellent smoke screen against frost.

In the United States, moss peat is commonly utilized as an absorbing and deodorizing material, as a filler or conditioner for concentrated mineral fertilizers, and as a source of organic matter for soils. Since it is relatively sterile it serves well as a packing material for the shipment of perishable plant products. It has even been used for stock food, in mixture with molasses. Finely shredded moss peat and sphagnum are used extensively by horticulturists and florists as media for seed germination, to start cuttings, to transplant and grow heaths

(*Continued on page 8, column 1*)

MEMBERS' NIGHT—

(Continued from page 3)

previous Members' Nights—the "open house" held in the laboratories, studios, and offices of the scientific and technical staffs on the ground, third, and fourth floors—will be repeated. Curators, assistants, technicians, taxidermists, preparators, artists, craftsmen of varied kinds, and others in the four scientific departments—Anthropology, Botany, Geology, and Zoology—will be on hand to greet guests and demonstrate steps in the preparation of exhibits and in the many research projects currently under way.

Museum Members and their guests may wander independently in these usually restricted quarters, or they may join small conducted tour-groups that will be assembled frequently under the guidance of the seven young women of the staff of James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures.

CAFETERIA; SPECIAL BUSES

Although the Members' Night program does not begin until 7 P.M., the doors of the Museum building will be open from 6 o'clock on. For those who wish to dine at the Museum, the Cafeteria on the ground floor will offer its services at regular prices from 6 to 8 P.M.

There is ample free parking-space at the north of the Museum building. For those who do not wish to drive their cars, special free motor-bus service has been arranged. A special bus marked to indicate Museum shuttle-service will leave Jackson Boulevard at State Street at 15-minute intervals beginning at 6:30 P.M. The last bus will leave the Museum at 10:45 P.M. In both directions the bus will make an intermediate stop at 7th Street and Michigan Avenue. This transportation is free—no fares collected, no transfers required.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received recently:

Department of Botany:

From: Bob Becker, Chicago—3 plants, Wisconsin; Holly Reed Bennett, Chicago—815 phanerogams, Illinois and Indiana; Dr. Henry Field, Coconut Grove, Fla.—12 cryptogams, Marco Island (Florida); Dr. Camillo Sbarbaro, Spotorno (Savona), Italy 101 bryophytes

Department of Geology:

From: George F. Brown, Chicago—collection of rocks and minerals

Department of Zoology:

From: Bernard Benesh, Burrville, Tenn. —126 beetles, Tennessee and Madagascar; Chicago Zoological Society, Brookfield, Ill. —1 crocodilian; Stanley Cole, Pente, Calif. —1 purebred Alaskan malemute dog; Harry Hoogstraal, Cairo, Egypt—1 hedgehog, 12 birdskins, 17 frogs, 156 lizards, 44 snakes, 2 turtles; Dr. James Kezer, Eugene, Ore.—96 salamanders; Marshall Laird, Singapore —11 lots of frog larvae, Australia; Dr. D. L. Lichty, West Palm Beach, Fla.—pit viper, Okinawa Island; Charles D. Nelson, Grand Rapids, Mich.—turtle (Geoemyda), Honduras; Dr. Otto Schubart, São Paulo, Brazil; —fresh-water shells; Gordon Thurow, Bloomington, Ind.—4 salamanders; U. S. Fish and Wildlife Service, Pascagoula, Miss. —collection of marine invertebrates, 319 fish specimens, Gulf of Mexico; Mrs. J. P. Watson, Chicago—lower jaw of fish, Bethany Beach, Del.

Daily Guide Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons. Requests for such service must be made at least one week in advance.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 5 P.M.

Seasonal Change in Visiting Hours

Autumn visiting hours, 9 A.M. to 5 P.M., will go into effect at the Museum on September 7, the day after Labor Day. The new schedule will continue until October 14, after which the hours will be 9 A.M. to 4 P.M. (5 P.M. on Sundays).

NEW MEMBERS

The following persons became Museum Members from July 16 to August 13:

Contributors

Harry Vearn Clyborne, William J. Gerhard

Associate Members

Harry D. Crooks, Gordon M. Jones, H. N. Sharrow, Edwin C. Sittler, Herman T. Van Mell

Sustaining Member

Seth L. Winslow

Annual Members

Dr. Lloyd J. Barson, Edward H. Bennett, Jr., Dr. Paul C. Bucy, G. Kenneth Crowell, Trevor L. Davies, W. L. Drechsler, L. E. Engstrom, E. T. Eyler, Harry N. Fisher, Ben L. Franklin, Mrs. William Y. Gilmore, Hixon Glore, Thomas J. Godfrey, Dr. Palmer W. Good, Joseph Goth, Herbert W. Hirsh, Arthur C. Hornburg, Herbert Isaacson, Lee Iversen, Mrs. Anastasia Javaras, G. E. Keister, Dr. Clement J. Kincaid, William H. King, Jr., Samuel W. Kipnis, W. W. Kovalick, Arthur G. Lorentz, J. D. McAuliffe, Miss A. Bernys McDevitt, Gordon L. McKnight, Ralph R. Minkler, Russell W. Morgan, Dr. Ernest Myer, Gordon B. Nash, Charles E. Norton, Wrigley Offield, Patrick L. O'Malley, Mrs. Margaret Parry, L. B. Perkins, Herbert L. Rodell, Charles H. Simon, Burton E. Simonson, Dr. W. Walter Sittler, Bernard A. Snyder, J. I. Stang, Frank C. Stover, Bolton Sullivan, Stanley J. Tanan, Sebastian Weigandt, Edwin M. Wood, Morris Yellin

Museum Programs on Saturdays . . .

DANCERS IN FALL SERIES FOR ADULTS, CHILDREN

A stage presentation, "American Indian Dances," will be given on October 2—for children in the morning and for adults in the afternoon—as the opening feature of this autumn's two series of programs. Both series will continue every Saturday throughout October and November in the James Simpson Theatre of the Museum.

The programs for adults, presented under the provisions of the Edward E. Ayer Lecture Foundation Fund, begin at 2:30 P.M., and the programs for children, provided by the James Nelson and Anna Louise Raymond Foundation, begin at 10:30 A.M. Both series are free, and no admission tickets are required.

The American Indian dances, accompanied by an explanatory commentary on the meanings of the various rhythms and movements, will be given by Mr. and Mrs. Roger Ernesti of Seattle. The Ernestis are internationally known for their authoritative enactments of the dances of tribes of both the Northwest and the Southwest, particularly the Kwakiutl and other tribes of the Pacific Coast. They wear authentic costumes and are accompanied by native songs and tom-toms.

For all the adult programs, a section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for reserved seats should be made in advance by telephone (WAbash 2-9410) or in writing. Seats will be held in the Member's name until 2:25 o'clock on the day of the program.

Story of the Indians

The story of American Indians, from their arrival in the New World from Asia (about 18000 B.C.) until they were encountered by the earliest explorers from Europe, is told by exhibits in James Nelson and Anna Louise Raymond Hall (Hall 4).

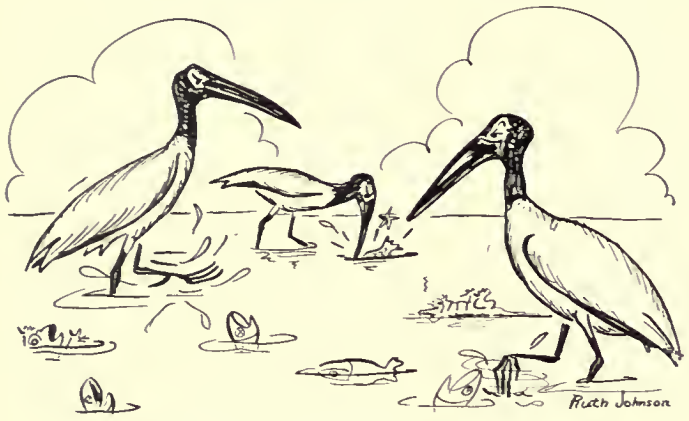
Rare Jewelry

Among rarities in H. N. Higinbotham Hall of Gems and Jewels (Hall 31) are examples of jewelry from ancient Egypt, Etruria, and the Orient.

BIRDS FISH BY MUDDYING-THE-WATER TECHNIQUE

By AUSTIN L. RAND
CURATOR OF BIRDS

IN THE DEEP SOUTH, when the water is low, small streams may degenerate into a series of isolated pools, and ponds shrink to a fraction of their wet-season size. The fish have a hard time then, for they're crowded into the little water that's left. But the fish-eaters profit. The raccoons and the herons find their prey coralled for them.



BIRDS FISH DEEP-SOUTH STYLE
". . . there were wood ibis in this country long before there were people."

It's then our southern Negroes use the fishing technique that's known as muddying the water. Its fundamental principle is to stir up the bottom and make the water so muddy that the fish come gasping to the surface, where they're easily caught. The sport has no rules. A hoe or a stick may be used to stir up the mud, or the people may just wade in and by walking, scuffing, and kicking the bottom stir up the mud. When the fish come to the surface they may be picked up by hand. If they're too lively they may be clubbed first or, if a dipnet is available, the fish may be scooped up in it. The species doesn't matter: catfish, stump knockers, war mouth, or bream—whatever there is.

I'd heard about this technique years ago, and it was vividly recalled to my mind in June when I was visiting at the Archbold Biological Station at Lake Placid, Florida. Richard Archbold and I were motoring east of the Big Cypress and had stopped to watch a congregation of "pond scroggins"—local term by which the herons, white ibis, and the like are designated collectively.

The birds were in an old flooded tomato-field and among them were about nine wood ibis, known as flint heads or iron heads in southern Florida. Most of them, apparently well-fed, were sitting quietly, but one, still hungry, was walking up and down the water-filled, vegetation-grown furrows, actively feeding. It was putting its bill down into the water every few steps, standing on one foot and stirring the water about its bill with the other. Apparently it was chasing small aquatic animals out of the submerged vegetation into its bill.

This reminded us of the well-known account of Audubon of another method of the feeding of the wood ibis. Audubon wrote that when wood ibis discover a place abounding in fish "they dance as it were all through it, until the water becomes thick with mud stirred from the bottom by their feet. The fishes, on rising to the surface, are instantly struck by the beaks of the ibises [and] on being deprived of life they turn over and so remain. In the course of ten or fifteen minutes, hundreds of fishes, frogs, young alligators, and water snakes cover the surface and the birds greedily swallow them. . . ."

The similarity of the methods used by the human fishermen and the birds is striking. One wonders if human beings learned the method from watching the birds or if they discovered it by themselves. Certainly, the birds' technique is older, for there were wood ibis in this country long before there were people.

FIRST CALL FOR ENTRIES OF NATURE PHOTOS

Early entries for the Tenth Chicago International Exhibition of Nature Photography are urged upon both amateur and professional photographers. The present is a good time to review photographs made during summer-vacation travel to select any that may be suitable. Although the final deadline for entries will not be until January 15, early entries greatly facilitate the work of the committee that handles the many details of filing and classifying the pictures for consideration by the judges.

Nature Camera Club of Chicago and Chicago Natural History Museum are joint sponsors of the contest. The exhibition of prints selected by the judges will be held in Stanley Field Hall of the Museum from February 1 to 28. The color slides will be exhibited on two Sunday afternoons, February 13 and 20, by projection in the James Simpson Theatre of the Museum.

No line is drawn between amateur and professional photographers in this competition. There are two separate divisions of entries—prints and color slides, with entries of four pictures permitted in each division by each contestant. In both of these divisions, entries, to be eligible, must fall into one of three classifications: (1) Animal Life, (2) Plant Life, and (3) General (this section includes scenery, geological formations, clouds, and other natural phenomena that do not fit into the two specific sections of biological subjects). Except for special prizes such as have been awarded by the Photographic Society of America in previous years, each classification has a full and equal group of awards of medals and ribbons.

Official entry forms containing detailed information on the contest will be sent to applicants by the Museum on request. Photographs should be sent directly to the Museum.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

RECORD OF THE ROCKS. By Horace G. Richards. The Ronald Press, New York. 413 pages, 294 illustrations. Price $6.

Since the war there has been a spate of new textbooks in the field of geology. One was reviewed by the writer in these pages (Garells, *A Textbook of Geology*, in BULLETIN, October, 1951). It has not been possible for this reviewer to see all of the postwar crop. All received favorable notice in professional journals when they appeared, and all have no doubt been adopted for teaching in various institutions. Competitors covering the same field must do so in different ways. Professor Garells' book approaches historical geology inductively, discussing physical principles at work on the earth's surface and then illustrating how these processes leave a record of their action. Dr. Richards' book, like the longtime favorite *Textbook of Historical Geology* by Schuchert and Dunbar and its successor, *Historical Geology* by Dunbar (reviewed in BULLETIN, May, 1949), approaches the same subject as a chronicle of events. Whether the reader will prefer one book or the other depends upon what he is seeking.

Four introductory chapters provide background for understanding the history to be related; three more review the classification of plants and animals and tell what fossils are. The remaining nineteen chapters record geologic events through three billion years. Each chapter details the rocks, the life, and the economic residua of one geologic period.

In outline, then, this book is very similar to Professor Dunbar's classic. In what way does it differ? Who will find it more useful than the other? The answer is given in the

subtitle, The Geological Story of Eastern North America. This book can include more detail than one that covers the world or the continent because it is geographically limited. Thanks to a further ingenious limitation, still greater detail is recorded in the important final chapters. The author, an experienced teacher, has intentionally included more information in each chapter than in the one before. As a textbook, this volume profits from that device, for the material presented keeps pace with the increasing perception of the student. It is probably equally effective in a book to be read without a teacher.

Dr. Richards' enterprises are many. His published works range from a definitive bibliography of fiction set in southern New Jersey through papers on petrology, Polish archaeology, marine plants and animals, Ice Age climates, oil drilling, and vertebrate paleontology to his monumental works on the stratigraphy of the Atlantic Coastal Plain. It is his experience in this last field that makes him particularly capable of writing a book devoted to the eastern United States and concentrating on the latest phases of its history, which are best seen in the sedimentary rocks fringing our Atlantic coast line.

As is not unusual in first printings, there are misprints, most of which do not seriously interfere with the use of the book. However, we should warn the reader against a series of attractive illustrations taken from recent commercial advertisements that show the spectacular forms of life in various geologic periods. The author and publisher, beguiled by their striking appearance, did not fully appreciate that the uninformed reader might derive quite a bit of misinformation from them. For example, in one a trilobite is shown swimming upside down; in another a plant-eating reptile devours with unnatural gusto a smaller animal.

The index, a weak point in many textbooks, is exceptionally complete and well prepared. It is interesting that the misprints in the text are faithfully indexed without rectification. Six of the illustrations are from specimens, paintings, or field work of Chicago Natural History Museum.

EUGENE S. RICHARDSON, JR.
Curator of Fossil Invertebrates

Technical Publication

The following technical publication was issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 34, No. 25. *Notes on Several Lizards of the Genus Emoia, With Descriptions of New Species from the Solomon Islands.* By Walter C. Brown. February 11, 1954. 14 pages. $.30.

An entire hall of the Museum (Hall N–1) is devoted to whales and porpoises.

OMNIVOROUS CROCODILE DEVOURS METAL, GLASS

By ROBERT F. INGER
CURATOR OF AMPHIBIANS AND REPTILES

EARLY IN JULY a seven-foot mugger crocodile (the common Indian species) that had died at Brookfield Zoo was given to the Museum. Since an animal of such bulk is difficult to preserve, we decided to save only the skin and skeleton. The routine chore of removing the viscera and flesh was brightened by the discovery of a peculiar collection of objects in the "gizzard."

The accompanying photograph of the gizzard contents indicates that this big reptile was not the least bit finicky in his diet. Among the delicacies he had swallowed were: five marbles, one whole and one broken peach stone, a piece of pecan shell, a bicycle reflector lens, a flash-bulb base, a second flash-bulb base from which the metal had been worn or corroded away (possibly by digestive juices), a piece of a comb, a beautiful dime-store brooch, a bent iron rod, eleven pieces from an orange pop-bottle, three bits of a broken Coke bottle, an air-valve cap, and a miscellaneous assortment of stones and fine gravel. Admirers of Pogo will recognize in this list a similarity to the appetite of Albert Alligator.

Most crocodilians—whether crocodiles, alligators, or caimans—are known to keep a supply of stones in the fore part of their stomachs at all times. As the stones are ground down by rubbing against one another and the food, the crocodilian replaces them by swallowing locally available material. In the case of our captive crocodile not only were some of the objects the kinds of things that give zoo authorities the shivers; but some of them (the comb, for instance) probably were not even very effective as substitute stones. Even in nature, crocodilians may have to resort to makeshifts. The American alligator frequently lives in streams and swamps so muddy that no stones are available. In such cases the alligator may swallow pine knots as substitutes.

Crocodilians are not the only back-boned animals to use gizzard stones. Chickens and their relatives as well as other seed-eating birds swallow small pebbles. Apparently even some dinosaurs made use of rocks in this way. It is an interesting fact that the crocodiles and birds are both descended from the same stock of reptiles that gave rise to the dinosaurs.

In parts of South America, natives examine the gizzard stones of caimans closely in the hope of finding grains of gold picked up by the animals from stream beds. Although producing no gold, our collection of "stones" is of interest to the Museum's paleontologists because many of the pebbles have shapes similar to those of stones brought back from digs.

'EVERYTHING BUT THE KITCHEN SINK!'
Autopsy on a late resident of the crocodile pond at Brookfield Zoo reveals that he thrived on a diet that included a brooch, bicycle reflector lens, photo flash bulbs, an iron rod, a tire cap, and other odd snacks.

Radioactive minerals, accompanied by radiographs made by them, are exhibited in Clarence Buckingham Hall (Hall 35).

USES OF MOSSES—

(*Continued from page 4*)

and evergreens, and for other similar purposes.

MOSS AS FOOD

Man, unlike many other animals, makes practically no utilization of bryophytes as food. In a century-old medical and economic-botany book is mentioned the use of sphagnum as a "wretched food in barbarous countries." Sphagnum is included also in a list of famine foods recently published in China. Laplanders have been reported to use the same moss as an ingredient of bread. It has been suggested that a person starving in the wilderness might try eating the spore-filled capsules of the various species of *Polytrichum.*

HAIR-CAP MOSSES

The hair-cap mosses (*Polytrichum*) were among the first mosses to receive a distinguishing name. Also called "golden maiden-hair," they receive their name from the long hairs that grow from a scale-like structure at the top of the capsule and form what is aptly called a "hair-cap." At one time, a decoction of the common hair-cap (*Polytrichum commune*) was much used to "strengthen and beautify" ladies' tresses—this is in accordance with the Doctrine of Signatures.

The value of this moss for bed and bedding is supposed to be great to the Laplanders. They select a patch of plants, cut out an area large enough for a bed, and separate this mass of intertwined plants from the soil. A similar portion of the moss patch serves well as a cover. The moss bed may be rolled up and carried from place to place. It is said that Linnaeus, in his wanderings, often slept on such a bed. The stems of hair-cap mosses have also been used to stuff mattresses and upholstery.

Gilbert White, in his *Natural History of Selborne*, writes as follows of another use of *Polytrichum commune:*

"While on the subject of rural economy, it may not be improper to mention a pretty implement of housewifery that we have seen nowhere else; that is, the neat little besoms which our foresters make from the stalk of the *Polytrichum commune*, or great golden-hair, which they call silk wood, and find plenty in the bogs. When this moss is well combed and dressed, and divested of its outer skin, it becomes of a beautiful bright chestnut color; and, being soft and pliant, is very proper for the dusting of bed, curtains, carpets, hangings, etc."

The stems of this common moss are often a foot to eighteen inches in length, and sometimes considerably longer. The central core of the stem, when cleaned, forms a pliable, tough strand well suited for the manufacture of brooms and of plaited articles such as baskets and hassocks, apparently quite an ancient art. Perhaps the oldest known example of it is a partially finished *Polytrichum* basket that was found at the bottom of the ditch of the early Roman fort at Newstead, Roxburghshire, in England. An indication of the age of the basket is given by the date (A.D. 86) of the latest coins found in the same ditch. The art of such plaiting is probably even of greater antiquity than the period of Roman occupation. (*Illustration on page 4.*)

MISCELLANEOUS USES

Certain mosses are sometimes utilized by florists to form banks of green in show windows, green carpets for floral shows, or to fashion into wreaths and crosses. In parts of Europe, moss is used in Christmas decoration to construct a manger for the spirit of the Christ Child. Some women's hats, a half century and more ago, were decorated with bundles of *Climacium dendroideum* and other mosses, a situation which prompted a student of mosses to write in 1874:

"And a lady's cap which we saw in a window was in no wise adorned by having sprays of artificial moss tacked all over it. . . . Nor is a bunch of moss which has died of thirst suitable for trimming a bonnet. The chief beauty bonnets at present possess is their being fresh and clean; dry moss is particularly fusty looking, and it is not improved by being dyed of a leather colour (!!), or a violent blue-green (!!!), the latter being the worst, as being a bad match, for moss is *never* a blue-green."

A number of home owners have recently tried to increase the beauty of their shaded walks by encouraging the growth of mosses there. Many of them have even transplanted mosses for this purpose. Others have encouraged the growth of mosses on new buildings in order to give them that "old look." In parts of Europe, *Fontinalis antipyretica* has been used for filling spaces between chimneys and walls. The basis of this practice is the erroneous belief that this moss will not blaze—thus, the name *antipyretica*, meaning "against fire." The stems of certain mosses are utilized by various Indian tribes for lamp wicks.

Indians have made use of dried sphagnum as a diaper material. A method of keeping live frogs in the laboratory consists of a tank with a layer of moss—damp sphagnum. The slight amount of iodine in the moss apparently helps prevent red-leg and other frog diseases. Sphagnum has been stuffed between the timbers of houses to deaden sound and, steeped in tar, has been used to calk ships.

In biology, the use of mosses and liverworts as laboratory subjects is of the greatest fundamental importance. Using bryophytes as experimental material, researchers have contributed significantly to our knowledge of various phases of plant science, including genetics, experimental morphology, and plant nutrition.

Thus far have been discussed the various ways in which bryophytes are useful. On the other side of the ledger, certain of them may be detrimental or harmful. Certain studies have indicated that sphagnum moss may be a source of sporotrichosis, a fungus skin-disease, among florists. Sphagnum moss may smother out a high proportion of tree seedlings, thus interfering with reforestation efforts. Some weedy mosses often crowd out grass in lawns where dampness is excessive. Species of *Sphagnum* and *Polytrichum* are sometimes found as weeds in infertile blueberry fields on moist soil.

Much effort and money are sometimes spent to clear canals of masses of water mosses. In certain regions, some mosses get a foothold on shingle roofs. Thus, a lodging for soot and dust is provided, and soon a sort of soil accumulates. In a shady situation, a new roof may become completely covered with moss within ten years. The rate of decomposition of shingles is greatly increased by the dampness held by the moss and soil. To remedy the situation, the roofs are creosoted every few years.

In conclusion, it is obvious that mosses and liverworts, though usually small plants conspicuous only en masse, are nevertheless of some importance to man. We realize once again the truthfulness of the statement made long ago by a sagacious clergyman that "nothing is useless in creation. The tiniest insects, the smallest mosses, have their uses."

In Case 809 near the northeast corner of Martin A. and Carrie Ryerson Hall (Hall 29—Plant Life) are displayed various mosses and liverworts. Peat and peat products are shown in Case 627 at the north center of Hall 28 (Vegetable Raw Materials and Products).

UNIVERSITY TO PRESENT LECTURES AT MUSEUM

"Sons of the Vikings," a lecture series featuring such world-renowned figures in the field of polar exploration as Peter Freuchen, Colonel Bernt Balchen, Captain Finn Ronne, Dr. Valter Schytt,, and Dr. Einaur Haugen will be presented by the Museum in co-operation with University College of the University of Chicago on five consecutive Sundays, October 10 to November 7, at 2:30 P.M. in the James Simpson Theatre of the Museum. Tickets for the series ($3.00 for Museum Members, $3.50 for non-members) may be obtained at University College, 19 South LaSalle Street (indicate Museum membership in order to receive tickets at the special price). All checks should be made payable to the University of Chicago. Single admissions at 75 cents each will be sold at the door if seats are available.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol.25.No.10-October-1954
Chicago Natural History Museum

MUSEUM MEMBERS' NIGHT
Friday, October 8

Chicago Natural History Museum
FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

FIVE JUDGES APPOINTED FOR PHOTO CONTEST

Judges have been chosen for the Tenth Chicago International Exhibition of Nature Photography. They are: M. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology at the Museum; Homer E. Holdren, of the Museum's Division of Photography; and three local camera experts: May Watts, Fred Richter, and Erik Sorensen. Accepted prints will be exhibited in Stanley Field Hall during February. Color slides will be projected on two Sunday afternoons, February 13 and 20, in the James Simpson Theatre of the Museum.

The deadline for entries is January 15 in the two separate divisions of prints and color slides. A contestant may enter four pictures in each division. Entries, to be eligible, must fall into one of three classifications: (1) Animal Life, (2) Plant Life, and (3) General (this section includes scenery, geological formations, clouds, etc.).

Official entry forms containing detailed information on the contest will be sent to applicants by the Museum on request. Photographs should be sent directly to the Museum. Nature Camera Club of Chicago and Chicago Natural History Museum are joint sponsors of the contest.

HERE'S WHAT YOU'LL DO AND SEE AT MUSEUM ON MEMBERS' NIGHT, FRIDAY, OCTOBER 8

A ONE-NIGHT COURSE IN MUSEOLOGY, the art of operating a museum, is in effect what Chicago Natural History Museum will present on **Members' Night, Friday, October 8.** The attractions prepared for this year's annual welcome to the several thousand Members of the Museum will touch upon all the principal phases of museology—research, expeditions for the collecting of data and material, preparation of the meticulously accurate scientific exhibits, methods by which the educational influence of the institution is made effective upon a mass-audience of millions, and general service to the public.

But Member's Night is not entirely a serious exposition of a scientific and educational mission. It is also a festive affair to open the autumn season, a time for a gathering of our friends from all over town. There will be entertainment. Movies of an expedition to Africa, with narration by the leader of the safari, Walther Buchen, Museum Trustee, will be shown in the James Simpson Theatre of the Museum. There will be special exhibits and a preview of the Museum's newest habitat group of animals. Throughout the evening, laboratories, workrooms, and studios from which visitors are usually barred will be open to Members and their guests.

YOU are cordially invited. A summary of the evening's program follows.

MEMBERS' NIGHT PROGRAM

Friday, October 8

7 p.m to 10:30 p.m.

(Museum doors open at 6 p.m.)

Transportation and Parking—

There is ample free parking-space at both the north and south entrance of the Museum building. For those who do not wish to drive their cars, special free motor-bus service has been arranged. Buses will leave corner of Jackson Boulevard and State Street at 15-minute intervals beginning at 6:30 P.M. Bus may be boarded also at 7th Street and Michigan Avenue. No fares and no transfers will be required from Museum Members or their guests. The last bus will leave the Museum at 10:45 P.M.

Dinner is Served—

Those who wish to come direct from their offices may dine in the Museum Cafeteria (on the ground floor), which will be open from 6 to 8 P.M. Regular service and prices will prevail.

In the Exhibition Halls—

Preview of new exhibit: "Malay Tapirs" (William V. Kelley Hall of Asiatic Mammals, Hall 17, Main Floor)—specimens in this habitat group were collected by an expedition to Siam sponsored and led by Rush Watkins, a Museum Contributor.

Special exhibit: "The Why of Museum Insect-Collecting" (Stanley Field Hall)—a graphic display accompanied by selected entomological specimens illustrating the nature and extent of research conducted in this field by this Museum and co-operating institutions.

Special exhibit: "The Big Dig" (Stanley Field Hall)—the story of archaeologists and how they work, told by a graphic outline of twenty seasons of excavating prehistoric American Indian sites in Colorado and New Mexico by the Museum's Southwest Archaeological Expeditions under the leadership of Dr. Paul S. Martin, Chief Curator of Anthropology.

In the Theatre—

Showtime is 8:15 P.M. The rumble of African tribal drums will sound to introduce the feature movie, "Marsh Birds of the Upper Nile," color-film record of the Buchen East Africa Zoological Expedition. The story of this safari in Kenya Colony and Uganda will be told from the stage by Walther Buchen, Museum Trustee, who with Mrs. Buchen sponsored and led the expedition.

Before or after the screen show, Members may view in its papyrus-marsh habitat the group of magnificent birds collected by Mr. Buchen's expedition (Hall 20, Main Floor).

(Continued on page 8, column 1)

THIS MONTH'S COVER

Our cover shows the giraffes from the African water-hole group in Carl E. Akeley Memorial Hall (Hall 22). The entire group is too large for our cover but zebra, eland, rhino, and gazelle are all gathered at the water.

Trustee Walther Buchen is speaking on Members' Night (Friday, October 8) about another African water group, the Nile River marsh-bird group (Hall 20), which he collected and presented to the Museum.

INDIAN DANCE STAGE-SHOW OPENS SATURDAY PROGRAMS

THE FALL SERIES OF LECTURES for adults on nine Saturday afternoons, provided by the Edward E. Ayer Lecture Foundation Fund, begins with an unusual stage presentation of American Indian dancing. The succeeding programs will feature color motion-pictures accompanied by the narratives of the men who made them. The programs will be given on each Saturday afternoon from October 2 to November 27, inclusive, at 2:30 o'clock. Limited accommodations make it necessary to restrict admission to adults. For children, however, free motion-pictures will be presented on the mornings of the same Saturdays by the Raymond Foundation.

THE ERNESTIS, COSTUMED FOR ONE OF THEIR INDIAN DANCES

Following is the schedule of the programs for adults:

October 2—American Indian Dances

Mr. and Mrs. Roger Ernesti

Although the Ernestis are known especially for their authoritative presentation of Indian dances from northwestern United States, their repertoire includes native dances of the great areas of the Plains, Plateau, Puget Sound, and the Southwest. Each dance, performed in native costume, is explained by Mr. Ernesti and is then enacted to the accompaniment of native songs and tom-tom. An anthropologist of the University of Washington said of the Ernestis' dances: "They are not interpretations of old Indian dances done in the pattern of our European culture, but rather excerpts from the ancient religious and social ceremonies, presented with as high a degree of authenticity as is possible today."

October 9—Across Tropical Africa

Len Stuttman

Mr. Stuttman's film and lecture give an interpretation of life in tropical Africa in different geographic and political environments. He focuses on Liberia, whose capital, Monrovia, was founded by freed American slaves one hundred and twenty-five years ago and is now the only all-Negro republic in Africa; the Belgian Congo, rapidly changing with the growth of commerce; and Kenya, last refuge for big game animals.

October 16—Guatemala

Adam Shaffer

The turbulent little country of Guatemala that has been in the news spotlight recently is brought to the screen by Adam Shaffer, who has recorded faithfully its scenic beauty, its spots of archaeological interest, its arts and crafts, and its customs. This program should give those interested in Guatemala an insight into its character—changing, and yet, in some respects, always the same.

October 23—Road to Grandeur

Francis R. Line

U. S. Highway 89 begins amid the wonders of Glacier National Park and stretches southward past Yellowstone, the Grand Tetons, Salt Lake City, Grand Canyon and the Indian country, Arizona, and then to the Mexican border. "Road to Grandeur" is a motion-picture story of a continuous journey along this famous roadway.

October 30—The Proposed 49th State—Hawaii

Fran William Hall

The famous scenes of Hawaii are recorded in Mr. Hall's film—Diamond Head, Waikiki, hula-dancing, lei-making, fiestas, banana-picking. But Mr. Hall also made films in inaccessible offshore islands of the Hawaiian chain that have seldom been photographed. In these remote spots grow a profusion of flowers, and rare birds are found, among them the native goose, the nene, of which there are now only fifty that have survived the inroads of civilization.

November 6—Tomorrow Never Comes

Neil Douglas

This film tells the story of the largest Alaskan bear. In addition there are shown caribou, salmon fishing, giant cranes, glacier scenery, and sea-lions. The training of a seal from its wild state to an almost human companion is pictured.

November 13—American Indian Adventures

C. J. Albrecht

Mr. Albrecht's film gives his audience an opportunity to see the life of the Indian, as guide, hunter, trapper, fisherman, rancher, and craftsman. Scenes of the making of buckskin from moose to moccasins and the carving of a peace pipe from historic pipestone are recorded. Pictures of life on the arid desert wastes and in the sub-arctic lands make this film a dramatic record of colorful peoples.

November 20—Argentina

Nicol Smith

Argentina has more than a million square miles of astonishing contrasts. Nicol Smith, first North American to make a compre-

(*Continued on page 7, column 3*)

RESERVED SEATS FOR MEMBERS

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

GREAT KIVA, TWO PUEBLOS UNCOVERED ON SOUTHWEST DIG

In September the Southwest Archaeological Expedition completed its 1954 season of excavations on sites in New Mexico. This is the twentieth year of these operations under the direction of Dr. Paul S. Martin, Chief Curator of Anthropology, who tells here the highlights of the season just concluded. The accomplishments on "The Big Dig" from the beginning will be summarized in a special exhibit in Stanley Field Hall on Members' Night, Friday, October 8.

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY
AND
JAMES T. BARTER
ARCHAEOLOGICAL ASSISTANT, SOUTHWEST EXPEDITION

ABOUT A.D. 1190, the Mogollon Indians in what is now western New Mexico were facing a situation common at some time to farmers the world over. For several seasons scanty rainfall had made the crops progressively poorer. Winter snows had scarcely blanketed the earth and spring rains failed. By the end of June the corn had barely poked a few withered leaves through the dusty earth.

The Indians of Higgins Flat Pueblo (excavated by Chicago Natural History Museum's Southwest Archaeological Expedition during the 1953 season) stood the drought better than some of their neighbors, for the San Francisco River still ran a small stream below the hill on which their village was situated. At other villages the springs had dried up, forcing the people to carry water several miles.

By mid-July everyone watched the skies for rain clouds. Unless rain fell the corn would fail and winter would be difficult. Already the people were skimping on corn to save the dwindling supplies. More nuts and berries, and the meat of wild animals were added to the diet of corn, beans, and squash. The precious seed-corn was guarded jealously for the next year to avert starvation and ruin.

MOURNED "GOOD OLD DAYS"

All through the pueblo people were worried. Never before had there been such poor crops. The old men sitting in the sun on the plaza walls talked of "the good old days." Children played around the pueblo walls, though many of the older boys were out hunting small game. The women ground corn-meal, but because they had less to grind now there was more time to gossip.

Almost everyone talked about the weather, but the priests, assisted by some of the senior men, were trying to do something about it. In the underground ceremonial room (kiva) they sang and danced to supplicate the rain gods. A large tubular stone pipe painted with stripes of red, yellow, black, and green to represent the four directions, was filled with tobacco and passed from hand to hand to be smoked. The smoke represented the rain clouds, for which everyone was praying. On the floor were replicas of a bear, a badger, and the sun-disk. Honey and cornmeal were fed to the bear and the badger to enlist their aid as representatives of the gods. Then the people waited for a sign. It was not long in coming. One of the massive beams that supported the kiva roof of sticks and mud collapsed. The priests immediately interpreted this to mean that the gods were dissatisfied with the ceremonial room of their earth brothers. The priests warned the people that performances of ceremonies had been lax of late and offerings were niggardly.

PLAN NEW STRUCTURE

A plan was put forth to build a larger and more magnificent structure. This one would also be rectangular and have a large lateral ramp down which six dancers could move abreast in an impressive processional entrance with the dignity and respect the gods expected.

Because the day of spring planting was reckoned as so many days after the winter solstice, which marked the beginning of a new year, the entrance was placed so that on this day the rising sun would shine down the ramp into the very heart of the kiva.

Digging this impressive structure was no easy task with tools of only wood and stone. Dirt was carried out and heaped along the outside walls by the women. This was an honor for them because usually the ceremonial activity was a prerogative solely of the men. Children helped by carrying small stones from nearby and distant rock-falls. The heavy stones were transported by men. Rocks were shaped by hammering and battering with stone mauls.

OLD KIVA PRESERVED

Because it was thought that it would not be wise to destroy the old kiva, its outline and part of the walls were left intact and the new edifice was built around them. Enclosing the old with the new would serve as a constant reminder that old ways must be revered even in this "modern" age.

When the structure was finished it was impressively dedicated. However, long before its completion, rains had come and, though crops were not good, at least some grain could be harvested. Now the winter was not so fearsome. Some of the very young and the aged would die, but life would go on—the favor of the gods had once more been wooed and won.

We imagine that this is the way our "Great Kiva" came to be built. Similar incidents have actually occurred among the Indians. At any rate, we did find and excavate a large subterranean kiva during this season's work of the Southwest Archaeological Expedition. This one is so large it might almost be classed as "monumental architecture." It would accommodate two badminton courts side by side within its

KIVA UNEARTHED BY EXPEDITION (Artist's Conception)

Restoration of Higgins Flat Kiva No. 1 by Gustaf Dalstrom, of the Department of Anthropology, as structure is believed to have appeared when occupied about A.D. 1200. The drawing is based on photographs and data furnished by the Southwest Archaeological Expedition, which excavated the kiva this summer. The feature that particularly distinguishes this kiva from similar discoveries in past seasons is the roofed wide ramp entrance at the right through which six ceremonial dancers could march abreast in a procession.

MUSEUM MEMBERS' NIGHT
Friday, October 8

walls, and the floor was seven feet below the surface.

A STATELY PORTAL

Entrance was not by means of the usual hatchway in the roof or by a small doorway such as the Indians crawled through in going from room to room in their homes. This was a stately entrance, the floor of which was a ramp that sloped gradually upward to ground level. The ramp was half as long as a bowling alley and wide enough to permit six people to march abreast in a procession.

MOGOLLON FLOUR MILL

Room in pueblo at Higgins Flat with mealing bins along wall, looking west (arrow 50 centimeters long points north). Bins and metates are arranged for grading meal from coarse to fine. Note pottery bowls to catch flour. Mill was in use by Mogollon Indians about A.D. 1200.

It took us about six weeks with a crew of seven men and the use of a tractor and scoop for a week to dig out the kiva. We estimated that we removed 500 tons of dirt and rocks (roughly equivalent to the capacity of 100 five-ton coal or gravel trucks). We loaded our ¾-ton truck more easily by driving it down the ramp right into the kiva proper.

ARTIFACTS UNCOVERED

What did we find? A few thousand sherds, architectural details, two painted ceremonial (?) stones, and an earlier smaller kiva, also subterranean.

The earlier structure had been built perhaps fifty to one hundred years before the later one, and the masonry was less skilfully done. The earlier kiva also had been entered by means of a ramp.

The placement or orientation of the ramps caused us to speculate at some length. The ramp-entrance of the later kiva faces southeast (about 27 degrees south of east). It is possible that this orientation was chosen because on December 21, the day of the winter solstice, the sun at rising time would shine directly down the center of the entrance. The date of the winter solstice is an important one in the calendar of the nearby Zuni Indians and it is probable that it was important in the life of the ancient Mogollon Indians.

The orientation of the ramp of the earlier kiva was more nearly due east and may have coincided with the position of the sun at rising time on the vernal and autumnal equinoxes (March 21 and September 21). Just why it was built on a different axis is a puzzle, but at a later date the Indians may have decided that it would be more pleasing to the gods to have the structure face the rising sun on December 21.

The roof of our kiva was supported by several (perhaps four to nine) very large posts. The evidence for this is the presence of nine mammoth post holes, seven feet deep and more than two feet in diameter. Since both earlier and later kivas used the same floor, we are unable to decide which group of post holes belongs to which floor.

After uncovering the kivas, we excavated two more pueblos or villages. One was composed of at least thirty rooms. We were seeking one of the latest towns occupied before the entire region was deserted. From it we hoped to find why the people had moved out of this fertile area. To determine what is "latest" is not easy, and it is probable that we failed in our quest to find a late pueblo. But we may yet discover what we seek.

We are still in the dark as to the reason or reasons for the abandonment of the area. Our best guess now is that drought or a shift in the rainfall pattern made farming difficult or impossible.

In the pueblos we found almost forty whole or restorable pieces of pottery; a milling room containing three corn mills, coarse to fine, and pottery receptacles for catching the flour; a small duck-effigy pot; several rectangular stone bowls; stone axes; bone awls; and stone beads.

VENTILATING DEVICE

One architectural feature interested us very much—a ventilating apparatus for introducing fresh air to inner rooms. Without such a device, fires could not have been maintained. It consists of an opening in the wall that connects with a stone-lined duct leading to an outside manhole or intake. Provision for ventilating rooms has been found in several other instances.

What do these bits of information and remnants of household and ceremonial paraphernalia tell us?

It seems fairly clear that the Mogollon Indians were placing more reliance on their cultural devices than on their biological mechanisms. Instead of being limited to a few unsatisfying wild foods, they acquired an abundant and nutritious food supply—corn, beans, and squash. In winter they could retire to well-built stone houses heated by a central fire-pit and ventilator instead of shivering in a cave or a shelter of skins. These Indians thus were shifting from dependence on brawn to trust in efficiency.

LABOR-SAVING PROGRESS

In addition, they gradually learned to make wider use of raw materials and to convert them to needs. We cite only pottery from clay, knives and axes from stone, and clothes, textiles, and sandals from fur or plant fibers. Finally, we have noted that conservation of time and muscular energy played an increasingly important role in Mogollon development. A new tool or device would be adopted if the user recognized that its mechanical efficiency would save human energy. A bow, then, is better than a throwing-stick, a fixed loom is better than a finger loom, and a grooved axe is better than a crude chopper.

ANCIENT STRUCTURE, MODERN SURVEY

Chief Curator Paul S. Martin (left) and Tod Egan, expedition aid, with instruments for study of orientation of kiva portal with reference to the position of the sun on date of Mogollon ceremonies.

MUSEUM MEMBERS' NIGHT
Friday, October 8

PLEASE NOTIFY MUSEUM IF YOU'RE MOVING

Members of the Museum who change residence are urged to notify the Museum so that the BULLETIN and other communications may reach them promptly. A card for this purpose is enclosed with this issue.

TALKING BIRDS: LOQUACIOUS ONES ARE MALES

By AUSTIN L. RAND
CURATOR OF BIRDS

ONCE THERE WAS AN AUDITOR who, in a mood of economy, suggested that we replace telephone operators with monkeys to handle the receiver and connections and parrots to do the talking. This obviously impractical scheme I vetoed. Not that monkeys cannot be trained to do many things, for they can be. Colin C. Sanborn, Curator of Mammals, tells me that in Siam monkeys were used regularly on some coconut plantations to climb the palm trees and throw down the nuts for the harvest. Monkeys have also been used to assist botanists in collecting plant specimens, and the following is from a BULLETIN account of fifteen years ago:

"The *Kew Bulletin*, No. 7, 1938, quotes from the Annual Report of the Director of Gardens, Straits Settlements, an account of the use made of berok monkeys (*Macacus nemestrina*), widely used in the East by the Malays for gathering coconuts, to collect botanical specimens from tall trees. Two young beroks, Jambul and Putch, are at present employed; they understand twelve words of Kelantanese and can thus be instructed to pick specific twigs, and drop them to the ground. Mr. E. J. H. Corner, Acting Director of the Gardens, who obtained the team from Kelantan, states, 'A berok upon the shoulder can be likened, in effect, to a falcon on the wrist; and its employment is recommended both to amateurs for its charm and cheapness, and to keepers of reserves where it is desirable to collect specimens repeatedly from the same trees without damage to them. Jambul and Putch are the first beroks to enter the government service."

I've traveled with a botanist in tropical forests and I've seen the trouble it is to get flowers from the treetops. Such simian help would be wonderful. If monkeys can be trained to do this, perhaps they have other latent capabilities.

BIRDS WITH LARGE VOCABULARIES

The birds present greater difficulties. Not that some can't learn to repeat human words, for they do. African gray parrots are usually considered the best talkers with the most human quality in their voices. The green Amazon parrots of Central and South America are also highly regarded as talkers. With the recent wave of popularity of the budgerigar or Australian shell parakeet in America we've become conscious of its ability to repeat words.

Karl Plath of Chicago's Brookfield Zoo tells me that he's heard a really good budgie called Blue Boy talk. It had a vocabulary of more than one hundred words (newspapers claim vocabularies of four hundred or more for some birds). Its pronunciation was good and it spoke in a strong human-like whisper with a child-like expression. Its repertoire included phrases like, "Hello, Mr. Tanner, how are you today?" and "What are you doing? Playing gin rummy? Yes, we'll play gin rummy."

Apparently males make better talkers than females, but some females do become accomplished talkers. It seems the important thing in getting a bird to talk is to keep it from other birds, tame it thoroughly, and repeat many times the words you want it to say. Once it has made a start and built up some vocabulary, it learns additional words quickly, and you can start on whole phrases, bits of nursery rhymes, lines of poetry, and whistled tunes. Not all birds are equally teachable, but neither are teachers equally good.

There's nothing in the Bible about parrots, nor in ancient Egyptian art. Parrots first appear in the literature of the western civilized world about a century before Aristotle. Their popularity has waxed and waned. One pinnacle of popularity was reached when large numbers were imported into ancient Rome to minister to the luxury of the age.

At present in the United States there has been a vogue for Australian shell parakeets or budgerigars. I've even seen them advertised in Chicago as TV birds, perhaps because they appeared on television shows but, it seemed to me, with the further implication that they would keep you company while you watched television. Also, a Chicago paper carried an account of a parakeet that got its education from television programs, where it picked up such phrases as, "Good-by now and God love you" and "Don't shoot, Ma'am."

The people of South America and of Africa probably kept parrots about their homes before Europeans knew the birds. According to Alfred Newton, when Humboldt was traveling in South America he saw a parrot that was reputed to speak an otherwise dead language of an extinct tribe of Indians who had taught their language to the parrot. Of course, parrots reputedly do live to a great age, and an authentic record of a parrot fifty years old was found in 1925 by Major S. S. Flower when he compiled age-records of animals. But a point that comes to the critical mind is that if none of the living people knew this language, how did they know the parrot was speaking it?

FLAIR FOR SPANISH

In El Salvador today the country people keep parrots. Some of the parrots are in cages, some are tethered to perches, and some are at half-liberty, with clipped wings and the freedom of a small tree in their yard. One of the El Salvador parrots is a green Amazon that talks well. Dr. A. J. van Rossem found that they learn Spanish much better than English. Many a human student has also found Spanish a relatively easy language to learn. Perhaps this is the reason, perhaps the Salvadorians are better teachers, or perhaps there is some obscure reason.

In Africa Dr. J. P. Chapin found that almost every settlement in the Upper Congo had a few African grays, and they're an article of commerce even now. Their value is such that parrot nesting-trees, whence are obtained the young, have owners. Incidentally, the tail feathers of the parrot are fashionable millinery on the Upper Congo. In earlier years when the trade in parrots was greater, Sir Frederick Jackson tells us that a part of Uganda provided many parrots. A hundred or more birds could be seen in the camp of a coastal-bound caravan, sitting on sticks in front of the tents and keeping up an incessant discordant chatter. Sir Frederick writes that at Fort Smith, Kikuyu, on one of the caravan routes, it was possible to recognize a Uganda caravan by the squawking of the parrots before it was seen.

MUSEUM MEMBERS' NIGHT
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Winter Visiting Hours

Winter visiting hours, 9 A.M. to 4 P.M., will go into effect at the Museum on October 15 and continue in effect until February 28.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

THE MAMMAL GUIDE—Mammals of North America North of Mexico. By Ralph S. Palmer. Doubleday and Company, Inc., Garden City, New York. 384 pages, 250 colored figures, 37 line drawings, and 145 maps by the author. Price $4.95.

This is the third book on North American mammals to be published in the past three years, and in some ways it is the most informative of the three. All the mammals are at a species level. Subspecies are not listed, but variation in the species is described.

The text for each mammal begins with a paragraph giving description, color, size, weight, signs of presence, and often comparison with related species. Headings of following paragraphs are habitat, reproduction, habits, and economic status. In these paragraphs a vast amount of pertinent information has been condensed, representing long and careful hours of research by Dr. Palmer. Common names have been carefully selected and are short and logical.

The 250 colored figures are on 40 plates bound in the center of the book. Most of the bats are represented by the heads only, showing the important features of the ears, nose, and lips. All the figures on each plate and on facing plates are drawn to the same scale. The color and form are good, and the plates should be a great help in making identifications. The other drawings include three pages of whales and porpoises, a distribution map for each mammal, and many drawings of the tracks.

The size of the book is 4¾ by 7½ inches, and thus suitable for carrying in the field. The last thirty-eight pages contain an index to the common and scientific names and to the colored and black-and-white drawings. *The Mammal Guide* will be a valuable book for use out-of-doors as well as a ready reference in libraries, schools, and other places where information is sought. Dr. Palmer has given us a condensed but complete practical guide.

COLIN CAMPBELL SANBORN
Curator of Mammals

BYWAYS IN HAND-WEAVING. By Mary Meigs Atwater. The Macmillan Company, New York, 1954. 128 pages, 27 illustrations, 36 diagrams. Price $8.50.

Byways in Hand-Weaving is a book on little-known weaving techniques from various parts of the world by a recognized authority on hand-weaving. Mrs. Atwater describes and illustrates with excellent diagrams methods of card-weaving, "inkle" weaving, braiding, plaiting, twining, and belt-weaving on a standard loom. The fabrics produced by these techniques are, for the most part, narrow bands, belts, and borders, although some of the patterns may be adapted to wider textiles. The original fabrics from which the patterns were taken have been found in ancient Egypt, ancient Peru, modern Guatemala, Scandinavia, and the South Pacific, and among various American Indian tribes.

In the final chapter there is a discussion of the use of such weaving techniques in connection with occupational therapy. Mrs. Atwater presents a brief analysis of the psychological factors that must be considered in adapting any weaving project to a given occupational-therapy program, and she discusses the suitability of the weaving techniques described in the book for various ages and psychological conditions of the patients.

Those who have some background in hand-weaving will find this book with its diagrams of unusual patterns most interesting and useful.

ELAINE BLUHM
Assistant in Archaeology

Two Museum Archaeologists in Southwest Symposium

The American Anthropological Association has devoted an issue of its magazine, *American Anthropologist*, to a symposium on the anthropology of southwestern United States. Chicago Natural History Museum is represented by two articles by members of its staff. One, in connection with the history and theory of Southwest archaeology is by Dr. Paul S. Martin, Chief Curator of Anthropology. The other, on gatherers and farmers in the greater Southwest, is by Dr. A. L. Kroeber, Research Associate in American Archaeology.

Daily Guide Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons. Requests for such service must be made at least one week in advance.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 5 P.M.

MUSEUM MEMBERS' NIGHT
Friday, October 8

SATURDAY LECTURES—

(Continued from page 3)

hensive color picture of this republic, presents nine different Argentinas in his film. He shows scenes of snow-covered peaks that dwarf the Alps, jungle waterfalls twice the size of Niagara, the cosmopolitan life of Buenos Aires, the famous turf race-track at San Ysidro, some of the finest of Argentina's horses, and the gauchos of the Pampas.

November 27—Expedition Ice Cap
Paul E. Victor

The interior of Greenland is a single vast glacier some 2,000 miles long and 1,000 miles or more wide. It took five years of grueling and skillful work for Paul E. Victor's expedition to set up a research station at the very center of the ice cap. To accomplish this, Mr. Victor and fellow-scientists burrowed into the thick ice and snow to construct an intricate network of research laboratories for radio, direction finding, meteorology, photography, atmosphere physics, and glaciology. During the five years of the expedition, exploring parties covered a total of 61,000 miles.

STAFF NOTES

Dr. Karl P. Schmidt, Chief Curator of Zoology, attended meetings of several scientific societies held from September 5 to 9 at the University of Florida in Gainsville under the auspices of the American Institute of Biological Sciences. He presided at the meetings of the Society for the Study of Evolution. Papers were presented at the meetings of the American Society of Ichthyologists and Herpetologists by **Loren P. Woods,** Curator of Fishes, and **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles. **Dr. Francis Drouet,** Curator of the Cryptogamic Herbarium, attended meetings of the Botanical Society of America . . . . **Dr. Austin L. Rand,** Curator of Birds, and **Associate Curator Emmet R. Blake** attended the meetings of the American Ornithologists' Union held from September 8 to 11 at the University of Wisconsin . . . . **Dr. Theodor Just,** Chief Curator of Botany, addressed the Chicago Rocks and Minerals Society on "Cycads, Living and Fossil." . . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently lectured before the Flossmoor Garden Club and the Skokie Garden Club . . . . **Mrs. Maryl André,** a graduate of Indiana State Teachers' College and former teacher of science in Gary schools, has been appointed to the Museum Library staff as a classifier and cataloguer. She replaces **Mrs. Stanley (Dawn Davey) Auerbach,** who is on a year's leave of absence . . . . **Miss Betty Lou Lesk** has been appointed secretary in the Department of Zoology.

MOVIES FOR CHILDREN, SATURDAY MORNINGS

The Fall Series of color motion-picture programs for children will be presented by the Museum on Saturday mornings during October and November in the James Simpson Theatre at 10:30 o'clock. These programs are given under the auspices of the James Nelson and Anna Louise Raymond Foundation. Three of the programs will include talks by the men who photographed the films being shown. Another program will depart from the usual showing of a movie to offer instead a stage presentation of American Indian dancing.

Admission is free. Children may come alone, accompanied by parents or other adults, or in groups from schools, clubs, and other centers. The program follows:

October 2—American Indian Dances
A stage presentation
Dancing by the Ernestis

October 9—Across Tropical Africa
Story by Len Stuttman

October 16—The Romance of Transportation
Story told in cartoon-style
Also a cartoon

October 23—Undersea Life
Also a cartoon

October 30—Monsters in Miniature
Tiny creatures of the insect-world
Story by Fran William Hall

November 6—Water Birds
A Walt Disney story
Also a cartoon

November 13—Hunting the Kodiak Bear
Story by C. J. Albrecht

November 20—Angote
Story about an Eskimo
Also a cartoon

November 27—Savage Splendor
A picture-hunting expedition in Africa

MEMBERS' NIGHT PROGRAM

(*Continued from page 2*)

Sashaying Around—

Throughout the evening Members and their guests may go everywhere in the building and see everything, including the places and things that ordinarily are placarded "No Admittance." Most of the laboratories, studios, offices, and workshops are on the ground, third, and fourth floors, and the Museum elevator will be at the service of guests.

In the Departments of Anthropology, Botany, Geology, Zoology, and N. W. Harris Public School Extension, and in the Library, Museum Members will be greeted by curators, artists, preparators, and other staff members who will be on hand to tell their part of the story of how the Museum operates, to demonstrate techniques, and to answer questions on scientific subjects. The tours of the Museum and its usually restricted areas may be made independently by Members, or they may join parties guided by the seven young women of the guide-lecture staff of the James Nelson and Anna Louise Raymond Foundation.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the past month:

Department of Botany:

From: Dr. Leandro Aristeguieta, Caracas, Venezuela—craniolaria annua; University of California, Berkeley—2 Salvador plants; Ralph Eiseman, Chicago—Nymphaea tuberosa, Indiana; Dr. Henry Field, Coconut Grove, Fla.—3 fungi, Wyoming; Dr. Fritz Haas, Chicago—phanerogam, Israel; Robert Hershey, Woodruff, Wis.—Ganoderma applantaum; Mrs. Meta Howell, Chicago—Morus alba var. multicaulis, Mexico; Illinois State Museum, Springfield—Carex Deweyana; Dr. Richard E. Schultes, Cambridge, Mass.—2 Vaupesia cataractarum (new genus), Colombia; Floyd A. Swink, Chicago—Muhlenbergia asperifolia; Dr. John W. Thieret, Chicago—46 hand-samples of Indiana woods; Archie Wilson, Mount Gilead, Ohio—23 Texas plants, 29 Mexican plants

Department of Geology:

From: Harry Cornfield, Chicago—Tertiary leaf, Colorado; Byron Harvey, Jr., and Byron Harvey III, Chicago—collection of fossil vertebrates, invertebrates, and plants, Europe

Department of Zoology:

From: Dr. Aurelio Malaga Alba, Mexico—23 Trinidad bats; American Museum of Natural History, New York—paratype of weevil (*Galandra corana*¦ Vaurie), Mexico; Dr. Bernard Greenberg, Chicago—8 lizards (Agama), Egypt; Dr. Fritz Haas, Chicago—3 salamanders, Canada; Carter H. Harrison, Jr. Chicago—fresh-water shells, Michigan; Richard Janovsky, Lockport, Ill.—4 birdskins, Korea; George J. Leahy, Chicago—sailfish, barracuda, dolphin, 2 pheasants; Dr. C. H. Lowe, Jr., Tucson, Ariz.—salamander; Lewis Stannard, Springfield, Ill., Clarence L. Goodnight and Marie Goodnight, Lafayette, Ind.—23 Ptiliid beetles, 5 Histerid beetles, Central America; Pvt. Wendel B. Swanson, Chiago—5 frogs, Australia; M. W. F. Tweedie, Singapore—snake (Calamaria), Singapore Island

Motion Picture Division:

From: Santa Fe Railway, Chicago—Navaho Indian film

A "family tree" tracing the origins of mammals is displayed in George M. Pullman Hall (Hall 13).

POLAR EXPLORERS SLATED IN U. OF C. LECTURES

Explorers whose names have become legendary in the field of polar investigation will be the featured speakers of the lecture series "Sons of the Vikings" to be presented in the James Simpson Theatre of the Museum, on Sunday afternoons, October 10 to November 7, at 2:30 o'clock.

Tickets for the series ($3.00 for Museum Members, $3.50 for non-members) may be obtained at University College, 19 South LaSalle Street (indicate Museum membership in order to receive tickets at the special price). All checks should be made payable to the University of Chicago. Single admissions at 75 cents each will be sold at the door if seats are available. The series is presented by the Museum in co-operation with University College of the University of Chicago and American Scandinavian Foundation. The schedule follows:

October 10—Peter Freuchen—Life Among the Eskimos

October 17—Commander Finn Ronne—Conquest of the Antarctic

October 24—Valter Schytt—Strategic Importance of the Arctic

October 31—Einar Haugen—Viking Voyages to the Arctic

November 7—Colonel Bernt Balchen—Survival in the Arctic

NEW MEMBERS

(August 16 to September 14)

Associate Members

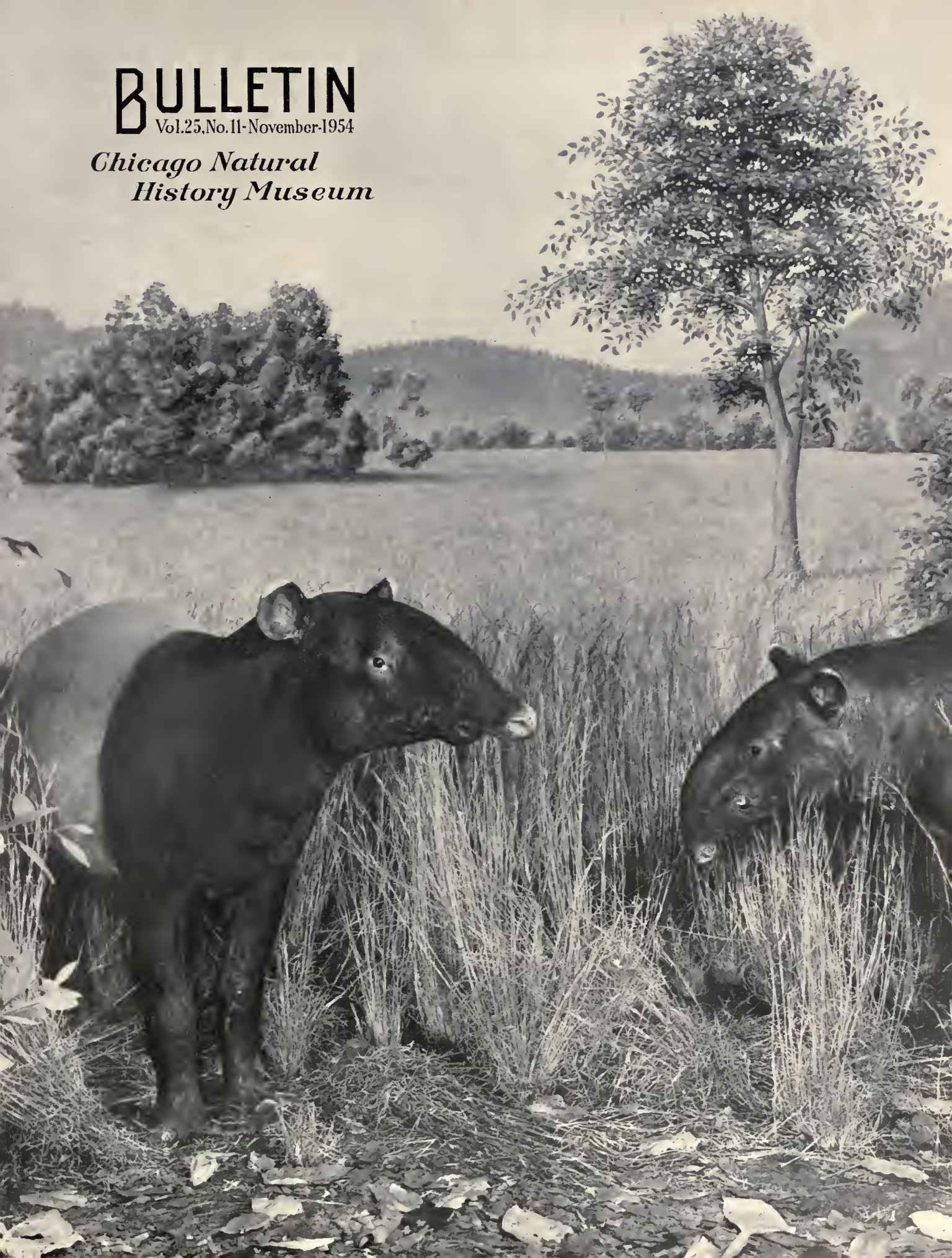
Warren W. Brown, Lyle B. Cline, Dexter Cummings, Dr. Edward C. Holmblad, Harry J. Owens, John W. Pope, J. P. Smith

Annual Members

James Alter, Herman Balsam, Dr. Melvyn A. Bayly, Mrs. H. H. Belding, Jr., Leo F. Biedermann, Mrs. Lucille T. Blakesley, Adolph Buechler, Frederick R. Carson, George E. Elfring, Kellogg Fairbank, Stanley K. Feinberg, F. D. Fyanes, Milton A. Goldstandt, Emmet Grannon, Louis Z. Grant, Foster W. Harmon, Dr. G. Duncan Hinkson, Miss Helen D. Horne, Roger D. Isaacs, Gust W. Isacson, G. Richard Isett, Carl W. Jackson, Dr. Hushang Javid, Herbert M. Johnson, G. Arthur Johnstone, E. A. Juzwik, William C. Kamin, Dr. M. V. Kaminski, Frank S. Kelly, Rev. Niketas Kesses, Dr. A. Charles King, Mrs. Calvin P. King, Mrs. Charles G. King, John D. King, Dr. Robert E. Lee, F. O. Leffler, James Lentine, Chester M. MacChesney, Frank A. Major, Ross O. Major, Alfred S. Markus, Eldon Martin, Michael J. Norton, Miss Margaret E. Perry, C. A. Piper, Dr. A. H. Rudolph, Newton E. Silber, John J. Simon, Dr. Manuel Spiegel, Ian Steven, Olof Svensson, H. G. Swanson, J. P. Templeman, James VanSanten, Mrs. India A. Walker, Ralph E. Weymouth

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 11 - November 1954
Chicago Natural
History Museum



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Members are requested to inform the Museum promptly of changes of address.

ALBERT BLAKE DICK, Jr.

1894–1954

With deep regret the Museum records the death, on October 24, of Albert Blake Dick, Jr., a member of the Board of Trustees since 1936 and a Vice-President during more than nine years of his trusteeship. Mr. Dick was elected a Trustee on December 21, 1936, and elected Third Vice-President on January 19, 1942. He served in that office until May 20, 1946, when he was elected Second Vice-President. He was especially active in Museum affairs as a member of the Executive Committee and the Finance Committee. Because of ill health he resigned his vice-presidency in May, 1951, but continued as a Trustee. He was a Corporate Member and a Life Member of the Museum, and on October 18, in recognition of his generous contributions to the funds of the Museum, he had been elected a Contributor by the Board of Trustees.

A. B. DICK, Jr.

Mr. Dick was born in Chicago on February 11, 1894. A Yale graduate, he was a notable success as an industrial leader, and at the time of his death was chairman of the board of the A. B. Dick Company, mimeograph manufacturers. He was also a director of several banks, other business establishments, and a railroad.

Mr. Dick was prominent in various civic organizations in addition to the Museum as well as in several charities. He was especially active as a member of the board of the Presbyterian Hospital of Chicago.

MUSEUM WELCOMES 1,156 AT FETE FOR ITS MEMBERS

A gratifyingly keen interest in the work and purposes of the Museum was displayed by the 1,156 people who attended Members' Night on the evening of October 8. The number of visitors was several hundred more than that for the previous year's fete and one of the largest for any special event held exclusively for Members and their guests.

Demonstrations of various phases of Museum activity given in shops, laboratories, and studios by members of the scientific and technical staffs drew lively attention. A near-capacity audience thronged the James Simpson Theatre to hear the talk by Walther Buchen, Museum Trustee, and to see his color motion-pictures of the zoological expedition that he sponsored and led in Kenya Colony and Uganda. Another crowd gathered in William V. Kelley Hall of Asiatic Mammals (Hall 17) for the unveiling of the new Malay tapir habitat group by Rush Watkins, Museum Contributor, who sponsored and led an expedition to Siam to collect the specimens. The two special exhibits of the evening, "The Why of Museum Insect Collections" and "In Search of History" (illustrating the purposes and methods of archaeology) proved so popular that they will be kept on display for several weeks.

The executive and scientific staffs of the Museum found in the many contacts with the Members inspiration and encouragement for continued and broadened effort in the Museum's scientific and educational programs. It is confidently believed that the Members, too, gained a clearer understanding of the workings of the Museum and the problems involved in carrying out its objectives.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

THIS MONTH'S COVER

The Malay tapirs on our cover are of the only living tapir species outside the Americas. The two in the photograph came from Siam and are in a new habitat group (see page 3) in William V. Kelley Hall of Asiatic Mammals (Hall 17). The specimens were collected in 1949 by the Rush Watkins Zoological Expedition to Siam and presented by Rush Watkins, a Contributor of the Museum. A group of the Brazilian tapir is exhibited in Richard T. Crane, Jr., Hall of American Mammals (Hall 16).

MOVIES FOR CHILDREN, SATURDAY MORNINGS

The Fall Series of color motion-picture programs for children will be continued at the Museum on Saturday mornings during November in the James Simpson Theatre at 10:30 o'clock. These programs are given under the auspices of the James Nelson and Anna Louise Raymond Foundation.

Admission is free. Children may come alone, accompanied by parents or other adults, or in groups from schools, clubs, and other centers. The schedule follows:

November 6—WATER BIRDS
A Walt Disney story
Also a cartoon

November 13—HUNTING THE KODIAK BEAR
Story by C. J. Albrecht

November 20—ANGOTE
Story about an Eskimo
Also a cartoon

November 27—SAVAGE SPLENDOR
A picture-hunting expedition in Africa

Last Viking Lecture on November 7

"Survival in the Arctic," a saga of polar exploration, will be presented on Sunday afternoon, November 7, at 2:30 o'clock in one of the lecture halls of the Museum. Colonel Bernt Balchen, famed for his exploits in the Far North, will be the lecturer. This is the last in the series of five "Sons of the Vikings" lectures presented by University College of the University of Chicago in co-operation with the Museum and the American Scandinavian Foundation. The university makes a charge of 75 cents admission. Tickets may be purchased at the door.

NEW ASIATIC TAPIR GROUP—AND STORY OF THE HUNT

By COLIN CAMPBELL SANBORN
CURATOR OF MAMMALS

A NEW HABITAT GROUP of the Malay tapir has been opened in William V. Kelley Hall (Asiatic Mammals, Hall 17). The two animals and the material for the group were collected in 1949 by the Rush Watkins Zoological Expedition to Siam led by Rush Watkins, of Chicago, a Contributor of the Museum.

The expedition, of which I was a member, first worked in Kam Pang Pet Province of north-central Siam, near the Burma border.

SUCCESS!
Native hunters and beaters with a tapir collected on Rush Watkins Zoological Expedition to Siam.

It is a region of low hills covered with heavy jungle and watered by numerous small streams and swamps. Aside from one or two small native settlements, the region is uninhabited. Signs of the wild elephant, tiger, and pig were plentiful. We had been told that tapirs also could be found here. A few animals were reported and some located, but conditions were not suitable nor was adequate personnel available for hunting them. For a week Watkins spent eight to ten hours a day tramping through the hot and humid jungle with two hunters and found some sign of the presence of tapirs, but he had no chance to shoot one.

After two weeks, operations were shifted to the west coast of southern or peninsular Siam. Here the hunt was placed in the competent hands of Man Lilabhan, an experienced wild-animal collector and dealer. The trip to camp started by plane from Bangkok and continued by train and truck. It ended with more than twenty bearers carrying the expedition's equipment four miles from the paved truck-road to our camp.

This was a more populated area, with many small villages along the road. The houses of the rice farmers, which are built on poles ten feet above the ground, were scattered along the edge of the jungle. There were many rice paddies, from the edge of which swamp and jungle extended to the distant hills. Pigs, tigers, leopards, and tapirs were fairly common.

Our camp was pitched on the bank of a jungle stream. Our party consisted of an expert tracker, sixteen beaters and camp boys, and two policemen who were detailed by local authorities for our protection and to keep order. The tracker was intimately acquainted with the habits of the tapir and it was through his ability and knowledge that two animals were secured.

RELATIVES OF THE HORSE

The Malay Moslems in the south will not touch the tapir because they believe it to be related to the pig. Our helpers even replaced with a tough vine a rope that was used to lift a tapir onto a skinning platform when they saw that the rope was blood-stained. The Siamese or Thai name for the tapir is "psom-sett," which means "the mixing is finished" or "mixture." This comes from a belief that the Creator made the tapir from the clay that was left sticking to His hands after the creation of all the other animals.

Tapirs are really most closely related to the horse and rhinoceros. Three species live in Central and South America and one, the Malay tapir, in Burma, Siam, the Malay States, and Sumatra (a history of the tapirs, by Philip Hershkovitz, Associate Curator of Mammals, appeared in the BULLETIN for September, 1949).

HOW THEY'RE TRACKED

It was learned from our tracker that tapirs feed at night, keeping on the move, and at dawn bed down in a thick bit of jungle for the day. If disturbed they always leave the jungle by the trail they made coming in. When the tracker found a fresh trail entering a jungle he circled the area and, if no tracks were found coming out, the hunters were posted on the entering trail and the beaters drove out the tapir.

By this means our two tapirs were secured. One animal stopped directly in front of the hunters. The other dashed out between two hunters into an open field and was shot on the gallop. In this last drive there were two tigers in the same spot of jungle, but they slipped out to one side.

A female tapir with a calf crossed the river one night and woke us with her splashing, but she could not be located in the dark. At another spot a female and calf were located and driven twice. Each time she turned back before reaching the hunters, either scenting them or going to rejoin her calf. In the south one young is born to a pair of adults in November or December, probably every other year.

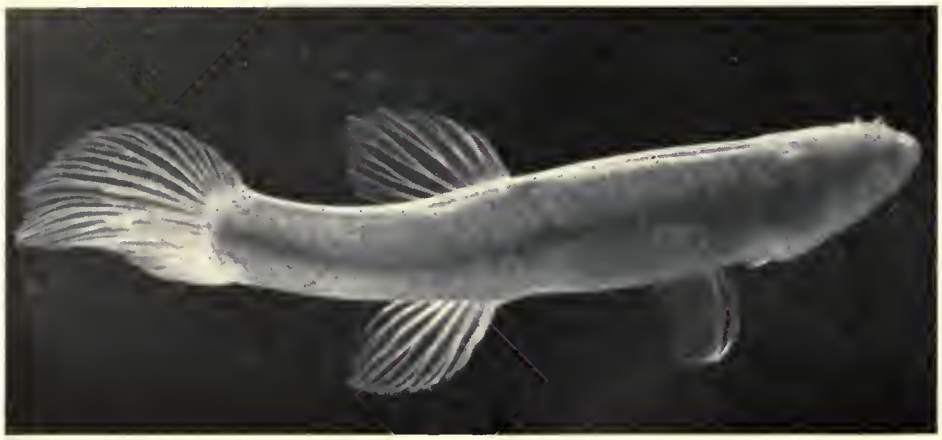
The Malay tapir is larger, with a thicker, heavier hide than the Brazilian animal. The large cats are the principal enemies of tapirs, the jaguar and puma in America and the much larger tiger in Asia. So it is not surprising that the Malay tapir has hide an inch thick on its neck, twice that of the American tapir. I collected and skinned three of the specimens for the Brazilian tapir group (Hall 16, American Mammals)

(*Continued on page 8, column 1*)

MYSTERIOUS FISHES FOUND IN CAVE POOLS AND STREAMS

By LOREN P. WOODS
CURATOR OF FISHES

THE WHITE BLINDFISHES living in the streams in caves and in other subterranean waters, such as springs and wells, have been the subject of interest and investigation since they first received public attention and description in the early 1840's. What were fishes doing in rivers deep in the earth far from any surface connection? How did they sustain life so far removed from the necessary source of all life, the sun? Why had they entered caves? Which surface fishes were their relatives? Why had their eyes degenerated? How did they find their way about from cave to cave and how did they locate food? Some of these questions were readily answered by simple observation. The answers to others are still largely incomplete, chiefly because no sustained investigation has been made of the habits and habitat of blindfishes.



SMALL BLINDFISH FROM SOUTHERN TENNESSEE

Tubes of the creature's nostrils protrude like horns. Rows of sensory papillae visible on the side of the head. Some pigment developed in this white fish after it had been kept in the light for one month.

Sixteen kinds of completely blind, exclusively subterranean fishes have been discovered in the underground freshwaters of the world. They belong to eight different families largely composed of normal-eyed fishes with one or two species of each family living in total darkness and without eyes. Most blindfishes are restricted to a fairly small area or to a particular limestone formation or cave system.

In North America two kinds of blind **catfishes** come from the artesian wells in Texas. Two kinds of blind **brotulas** are known from the subterranean freshwaters of Cuba and one from Yucatan. These are especially interesting because all other members of the brotula family live in the ocean. Another kind well-known to aquarists is the **cave tetra** from San Luis Potosi, Mexico. This species reveals a four-step gradation in the degeneration of the eyes from perfectly eyed, normally pigmented, surface-dwelling individuals to totally blind ones with the eye socket covered with tissue and no evident eye structure.

Three kinds of white eyeless fishes, the **big blindfish, Rosa's blindfish,** and the **small blindfish,** live in the underground waters of the Mississippi Valley, particularly in the unglaciated parts of Indiana, Kentucky, Tennessee, Missouri, northern Arkansas, and northern Alabama. These fishes are all fairly closely related, belonging to one very distinct family, the Amblyopsidae. The **big blindfish** lives only in the Mammoth Cave area and in south-central Indiana. **Rosa's blindfish,** its nearest relative, lives in southwestern Missouri and northwestern Arkansas. The **small blindfish,** widely distributed in Kentucky, Tennessee, Alabama, and south-central Missouri, superficially resembles the other two blindfishes but actually is more closely related to the only eyed members of the cave-fish family—the slightly pigmented **Agassiz' springfish** (which lives in caves, wells, mouths of springs, or even in surface streams under rocks) and the **rice fish** (which lives in blackwater swamps and in the shady sluggish parts of streams of the coastal plains from Virginia to south-central Georgia).

Superficially all three of these species of blindfish have the same appearance. When alive, the fishes are translucent white, with a flush of pink around the gills. When dead or preserved, they are pure opaque white. The head is flattened on top, snout broadly rounded, and body heavy near the head, tapering to quite thin near the tail. All the fins are broad and rounded (two of the three kinds do not have a set of paired ventral fins). The vent is not in its normal position but has migrated as far forward as it can to a position under the gill openings.

Blindfish are not the sole inhabitants of the Mississippi Valley caves. They live in company with several kinds of eyeless invertebrates—crayfish, aquatic sow bugs, scuds, worms, flatworms, and mites. All of these are sources of food for the fishes. These invertebrates with their scavenger habits feed on vegetable debris and organic materials in mud and water when such substances are washed into the underground waters from the surface. Some feed on bat guano. Occasionally surface-dwelling fishes, such as **sculpins, minnows, catfish,** and even **sunfish,** are found living in underground streams, but they are normally colored and possess eyes comparable to those of their species living in surface waters. Although sometimes found in considerable numbers in underground waters, these surface species of fishes are probably only temporary residents and very likely leave the underground habitat to spawn or feed.

EVIDENTLY FEEL THEIR WAY

Undisturbed blindfishes observed in caves are generally seen just above the bottom of the stream or lake moving about by means of slow oarlike strokes of the pectoral fins. One lazy stroke is followed by a long glide until the momentum is dissipated, and then another stroke follows. They usually come to rest in contact with the stream-bottom or a boulder. When they collide with a boulder or other object it is usually without much force.

If a strong flashlight beam is held on the fishes they slowly move away, but they do not pay attention to a weaker diffuse light. Sometimes they are alarmed and retreat to a hiding place if someone wades in the water near them. They are also greatly disturbed by the slow approach of a dipnet and, if closely approached or touched, they use their tail fins to dart wildly away toward the surface or under a rock. Occasionally they escape by hiding in a cloud of muddy water. Although they frequently collide with rocks or gravel shoals they seem to know their neighborhood and the collisions may be deliberate—perhaps they ascertain their location by thus "feeling" their way. They do not move incessantly, as does the Mexican blind tetra, but usually remain quietly resting with their tails drooping in order to maintain contact with the bottom. This more or less continuous contact with the solid parts of their home-range must be necessary to prevent their being carried away and "lost." During our cave collecting, if we missed capturing a fish we had only to return to the same locality later—sometimes several days later—and there would be our fish resting against the same rock as when we first observed it.

It has been demonstrated that the skin of blindfishes is sensitive to light and small temperature differences. Head, body, and even the tail fin have many short rows of very sensitive dermal papillae each with a

nerve fiber exposed at its tip. The eyed species of this family also are well equipped with these organs and probably rely more on them than on their eyes for information about their surroundings.

Fishes of the eternal dark are blind, but they certainly are not oblivious to their surroundings nor do they fumblingly grope their way about as do blinded surface animals. Their senses of touch, taste, and smell, though perhaps limited to their immediate surroundings, are so highly developed that these fishes do not appear to need sight, the sense on which the Primates are so dependent and for which an additional element, light, is needed.

INSENSITIVE TO SOUND

Blindfishes do not appear to be sensitive to sound, however. We could clatter our equipment or talk in loud voices without disturbing them. Some of these fishes that we kept in an aquarium would start violently if we suddenly rapped hard on the table on which the aquarium rested. This reaction to strong low-frequency vibrations probably was sensed as much by touch as by sound. The auditory apparatus is normally developed in these fishes, and they probably can hear as well as most other fishes but are just indifferent to sound. While some caves are absolutely quiet, others are very noisy from water dripping or small springs pouring from wall or roof. This noise is amplified by being echoed and re-echoed through the cave, and sometimes it was necessary for us to shout in order to carry on conversation above the noise that to us sounded like several people talking at once just around the corner. Such noise loses little intensity on transmission through water or from air to water.

Cave fishes are not gregarious but more or less solitary, and they pay little attention to other fishes as they move about. When several were seen fairly close together, presumably in a good locality for feeding, their position and their movements were independent, never grouped. The one exception was in a lake where we saw an unusually large fish followed by a close school of twelve to fifteen tiny fish, presumably its young.

The most favorable conditions for cave fishes appear to be reaches along the stream comparable to long, deep, quiet pools of surface streams. They were most often found where the water was fairly deep (2 feet or more) and where the bottom was thickly covered with a layer of fine silt. They seemed to congregate around rocks that cropped out through the silt. In a few caves solitary individuals were living in shallow streams with a rocky or gravel bottom and a fair current. In such places the fish took advantage of every sheltering eddy behind rocks and bars and even moved into water an inch or so in depth at the edge of the stream to avoid the current.

DISTRIBUTION OF CAVE FISH FAMILY IN EASTERN U.S.

Dashed line marks southern limit of glacial drift; dotted line, the Mississippi Embayment, a Cretaceous encroachment of the sea. The x's indicate the range of the ricefish, and the triangle symbols denote that of the springfish (both of these species are eyed.) The square symbols trace the range of the small blindfish; outline circles, the large blindfish, and solid black circles, Rosa's blindfish.

The most favorable type of habitat, judging from the hundreds of blind fishes seen in it, was an underground lake, 25 to 75 feet broad, with water 3 to 4 feet deep and a bottom of soft silt 1 to 2 feet in thickness. A stretch 400 yards long of this lake was examined by four slowly stalking men, and more than a thousand fish were seen scattered over the bottom. Also in this place the largest individuals of the **small blindfish** were observed to be almost equal in size to average individuals of the **big blindfish.**

SEEM TO BE HARDY

All cave fishes we have collected were fat and appeared to be in excellent condition. They store fat between the lengthwise muscle layers along the midline of the back, along the midline of the sides, and also in the tissues surrounding the viscera. Very likely they normally survive fairly long periods of starvation and remain in good condition. We have kept them for three months in an aquarium where they refused all food and were not noticeably thinner at the end of this time. They have been kept for as long as nine months, during which time they never ate. All are known to be carnivorous. The majority of stomachs examined were empty but a few contained crayfish and sow bugs. Although we have observed the fishes for several hours in the caves, we never saw one feeding.

The egg-laying or spawning behavior of the amblyopsids has never been observed but it is known that in one species, the **big blindfish,** the eggs are carried in the gill chamber of the female and the newly hatched young are incubated there also. Probably the young stay in the gill chamber until they are able to swim and follow the parent. There are no observations on young re-entering the brooding chamber once they have left it. It has been reported that 60 to 70 eggs are laid by the female into her gill chamber, where they remain for about two months. The opening of the oviduct is located far forward in this group of fishes in a position just under the gill openings.

Fishes with ripe eggs in the ovary or with eggs or larvae being incubated have been taken from Indiana caves during various times from March to November. It is quite likely that they spawn throughout the year. Although only this bare outline of the reproductive habits of the **big blindfish** is known, the displacement of the oviduct opening and the enlarged gill chamber with reduced gills also occur in the other species of this family and indicate that they have similar habits of caring for their eggs and young.

(To be continued in the next issue)

RARE FOSSILS UNCOVERED IN MUSEUM 'QUARRY'

By BARBARA POLIKOFF

ROOM 88—a workshop on the third floor of the Museum—has been unofficially dubbed "Mecca," a designation derived from the name of the Indiana town where slabs of shale were removed from a quarry and brought to the Museum for study of their fossil content by Dr. Rainer Zangerl, Curator of Fossil Reptiles, and Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates. Although the name Mecca usually denotes a goal of pilgrims, the Museum's Mecca marks not the end but the beginning of a pilgrimage—back 240,000,000 years to the middle of the Pennsylvanian period and climax of the Coal Age—a pilgrimage being made with the help of fossils from which Zangerl and Richardson hope to learn enough to reconstruct as complete a picture as possible of the animals and their environment at that remote period.

THE GIANT PUZZLE

Rainer Zangerl, William D. Turnbull, and Eugene S. Richardson, Jr., of the Department of Geology, study a map of the Mecca quarry to determine if the shale is reassembled correctly in the Museum workroom.

As often happens with significant finds, the discovery of the Mecca site was purely accidental. Curator Zangerl was driving along Highway 41 in Parke County, Indiana, when he spotted a hillside littered with slabs of shale. Thinking that the shale might contain vertebrate fossils he stopped to investigate. The first slab he examined had a shark's fin on it—an unusual find in Pennsylvanian deposits. Several return trips to the hillside convinced him that the site was an unusually rich one—not only were marine vertebrates and invertebrates abundant, an uncommon occurrence in itself, but many of the specimens were partially articulated remains. Up to this time few such nearly complete remains had been found in this country and the knowledge of Pennsylvanian marine vertebrates is consequently very sketchy, since it is based almost entirely on isolated fragments such as teeth, scales, and fin spines.

LARGE-SCALE PROJECT

Curator Zangerl encouraged Curator Richardson and Dr. Robert H. Denison, Curator of Fossil Fishes, to aid him in making a reconnaissance of the Mecca area. All three men agreed that the fossils found there would furnish new information about the marine life of the Pennsylvanian period. They mapped out a plan of study, and Project Mecca was ready for launching.

The first step was the digging of a quarry so that slabs could be removed from the hill and brought to the Museum for study. Because of the large concentration of fossils in the shale, only a small section was needed to give a fair sampling of what the deposit in the area contained. Permission was obtained from Noble Auld, owner of the land on which the hillside was located, to dig on his property. Mr. Auld aided the operation by bulldozing about 125 tons of dirt off the fossil-bearing shale. The last foot of overburden was removed carefully by the Museum field party consisting at various times of Zangerl and Richardson, William and Priscilla Turnbull of the Museum's Department of Geology, Peter Garrison, a student from Antioch College, and Richard McClung of Hyde Park High School.

The plan was to break a section of shale (approximately 5 yards long by 6 yards wide and 14 inches thick) into slabs and to label each slab with a code that would make it possible to reassemble them in their original pattern back in the Museum. Some of the shale, made brittle by relentless sun and rain, had to be studied in the field because moving it would have caused it to disintegrate. The slabs that could be transported were loaded on trucks. This was done without too much difficulty by driving the trucks to the quarry and doing the loading right on the quarry site. But when the rains came, which they did with disconcerting frequency, the dirt road became as slick as oil and driving on it was impossible. On these occasions Turnbull and Garrison hauled the slabs through dense foliage and up and down gullies to the highway where the trucks were stationed. It is reported that each evening these intrepid members of the field party renewed their strength for the following day's work by drinking a brew of sassafras tea made from the roots of surrounding trees.

STUDY BEGINS

After about ten trips to Mecca, some lasting two weeks, the designated part of the quarry was successfully transferred from Indiana to the Museum workshop. When the jig-saw puzzle job of reassembling it was completed, the study of the fossils was ready to begin.

Now Zangerl and Richardson, with the assistance of Antioch College students Peter Garrison and Shirley Hale, are separating the sheets of shale, layer by layer, piece by piece, and studying each one for fossils. When they find one they record its identification and its position on a scale chart. They are then able to look at such a chart and see what fossils occurred in a particular level, where they occurred, and with what frequency. When an unknown fossil turns up, it is given a code number and is laid aside for future identification. Curator Zangerl estimates that by the time the project is completed, about 180 folio-size charts will have been made.

Several factors are considered in studying the fossils. One of these is their state of decomposition. Because scientists have determined through aquarium experiments what conditions cause rotting and decay and what conditions lead to preservation, the state of decomposition of the fossil reveals something about the habitat of the animal. So many of the Mecca fossils are partially or wholly intact that Zangerl and Richardson conclude that they were buried in a mud lacking in oxygen since the absence of oxygen is one of the conditions necessary for preservation.

The frequency with which fossils appear in succeeding levels of shale is also important. Using a quarter of an inch of shale to represent a unit of time, Zangerl and Richardson have found that the frequency with which palaeoniscoid fishes occur

in different levels fluctuates sharply. In levels where the density of occurrence is highest, they have found a liberal sprinkling of most of the other life forms also. From this evidence they conclude that, at the time of the frequency-peaks, conditions were unfavorable to life, causing many animals to die and be buried. But those conditions changed as indicated by the abrupt decrease in the presence of fossils in succeeding levels. What circumstances caused this rhythm of change may be revealed as the study progresses.

Although much has been accomplished in the study of the Mecca fossils, most of the work still lies in the future. But the rewards so far have been encouraging. Specimens of sharks have been found of which, up to now, nothing but teeth have been known. Other specimens that might prove to be entirely new, such as a shrimp-like invertebrate, have been uncovered. We await the conclusions of the Mecca study with interest, anticipating the time when a look backward to a more complete picture of life 240,000,000 years ago may be possible for the layman as well as the paleontologist.

1,425 BIRDS AND MAMMALS ARRIVE FROM AFRICA

A collection of approximately 1,000 birds and 425 mammals has been received from Angola (Portuguese West Africa) as an interim shipment from the operations there by the Conover Expedition. The expedition, financed with funds provided by the late Boardman Conover, Museum Trustee and Research Associate in the Division of Birds, began its work in January under the leadership of Gerd Heinrich, zoological collector from Dryden, Maine.

Included in the shipment of birds is a species new to science, a number of new subspecies, and specimens that indicate extensions of ranges beyond previously known limits. Nearly all the mammals received represent species new to the Museum's collections. Although the mammal specimens are not yet in condition for study, the first general survey shows a number of species not recorded from Angola.

Peruvian Mammals Received

Mammals collected by the Peru Zoological Expedition, 1953–54, from the almost unworked part of northern Peru (west of the Andes) were recently received by the Museum. This collection of 470 specimens, together with the first shipment from southern Peru (south of Lima), fills many gaps in our knowledge of the north-south distribution of Peruvian mammals, reports Colin C. Sanborn, Curator of Mammals. Bats new to Peruvian fauna are also included in the collections.

Celestino Kalinowski, leader of the expedition, has resigned from the staff but will continue to collect for the Museum. He is now exploring the Alto Madre de Dios River in southeastern Peru, a rich and zoologically unexplored area.

4-H Youths From All U.S. To Visit Museum

Approximately 1,300 boys and girls from all parts of the United States and Canada will visit the Museum on November 30. These rural youths, who are coming to Chicago as delegates to the National Congress of 4-H Clubs held simultaneously with the International Live Stock Exposition, have been selected for excellence of achievement in their local communities. The entire staff of Raymond Foundation lecturers will be assigned to guide the young people to exhibits of most interest to them.

Audubon Lectures to Begin

The Illinois Audubon Society will open its 1954–55 season of five free "screen-tours" on Sunday afternoon, November 28, in the James Simpson Theatre of the Museum. "Wild America" is the title of the first presentation, a color film accompanied by a lecture by Roger Tory Peterson, one of America's noted ornithologists. The program begins at 2:30 P.M.

The other Audubon film-lectures will be: January 9—"A Missouri Story," by Alfred G. Etter; February 27—"Canada North," by Bert Harwell; April 3—"Mormonland," by Patricia Bailey Witherspoon; April 24—"The Grass Forest," by Robert C. Hermes.

Admission to all of these lectures is free to the general public. Members of either the Museum or the Audubon Society may obtain reserved seats by presenting their membership cards before 2:25 P.M.

How mosquitoes spread malaria is shown in an exhibit in Albert W. Harris Hall (Hall 18).

MEMO TO CAMERA FANS

Send your entries now for the 10th Chicago International Exhibition of Nature Photography, to be held at the Museum February 1–28. Final deadline is January 15. Entries are accepted in two divisions, prints and color slides. There are three classifications in each division: animal life, plant life, and general. The contest is jointly sponsored by Nature Camera Club of Chicago and the Museum. Entry forms with full information are obtainable by request to the Museum.

CURATOR DENISON BACK FROM EUROPE STUDIES

Dr. Robert H. Denison, Curator of Fossil Fishes, has returned from a year's study-trip to Europe under a fellowship from the John Simon Guggenheim Memorial Foundation. The primary purpose of his work there was to acquire information from museum collections and from the field on the occurrence of early vertebrates in an attempt to determine their habitats.

He first visited the Paleontologisk Museum in Oslo, where there are large collections from the Devonian of Spitsbergen as well as a small but important collection from a single quarry in Ringerike (not far from Oslo). During his stay he was fortunate to participate in the discovery in Ringerike of abundant fishes in a road cut. He worked next at Naturhistoriska Riksmuseet in Stockholm, which possesses large collections from Poland and Spitsbergen. This museum, which is extremely active in the study of early fishes, has developed important techniques for the determination of details of their internal anatomy from preserved skeletal parts. At the beginning of the year he moved to London and the British Museum (Natural History). Here is the largest collection extant of fossil fishes, which includes classical specimens representing the first known examples of many groups.

Curator Denison devoted the spring and summer months to field work in many parts of Great Britain. In Cornwall the Devonian rocks outcrop along the shore cliffs, and fossils are not uncommon but are poorly preserved. In Pembrokeshire, South Wales, where rocks of similar age are well exposed along the coast, fossils are better preserved but are not at all common. The borderland between England and Wales, an area where the geology of the Devonian "Old Red Sandstone" was first deciphered, is the source of many of the early collections of Devonian fishes. Today the rock outcrops are very scarce, since there is no longer any quarrying of the Old Red Sandstone and the railroad and road cuts are all overgrown, but there are a few localities where good specimens may still be obtained. In contrast, the Scottish collecting is excellent, sometimes yielding entire fishes that are beautifully preserved.

More than 500 specimens were obtained, an important addition to the Museum's study collection, for they include many genera and some families new to us. A few of the finer specimens will eventually find their way into the exhibits.

"Trips to the bottom of the sea" may be made by visiting the submarine dioramas in the Hall of Fishes (Hall O). There is also an underwater view of the life of a fresh-water lake in Michigan.

TAPIR GROUP—

(*Continued from page 3*)

in 1927 and found the Malay tapir a much more difficult animal to handle.

The two tapirs collected by the expedition weighed between 700 and 800 pounds each. It took four men three hours to skin one, and four men another three hours to clean the skin after it was brought into camp. One man spent five hours shaving the skin side so that salt would penetrate more easily. It was estimated that the basic care of one skin in the field required thirty-six man-hours and the preparation of the skeleton another twelve. Almost daily there were showers, the humidity was high, and great difficulty was experienced in drying the heavy skins.

The setting of the exhibition group in the Museum looks out from a jungle, across a meadow to the hills beyond. Two tapirs are resting and feeding at the edge of the jungle before bedding down for the day.

The animals were prepared by Leon L. Walters, recently retired taxidermist, assisted by Taxidermist Ronald J. Lambert. They were prepared by the celluloid reproduction method originated by Walters and are his last work after forty-three years with the Museum. The background was painted by Staff Illustrator Douglas E. Tibbitts. Accessories and groundwork were prepared in part by Frank C. Wonder.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Teresa Drake, Chicago—Chippewa of Potawatomi bandoleer and pouch, Sioux pipe bag, Upper Great Lakes and Plains; Mrs. Selma O. Nelson, Chicago—pair of moccasins (Lapp type), Sweden

Department of Botany:

From: Professor L. Branisa, Sucre, Bolivia—2 lichens; W. L. Culberson, Madison, Wis.—15 lichens; Mrs. Fay K. Daily, Indianapolis, Ind.—556 miscellaneous cryptogams; Mrs. S. J. Digree, Kodiak, Alaska—Orchis aristata; Henry S. Dybas, Chicago—51 fungi; Dr. Norman C. Fassett, Madison, Wis.—34 phanerogams, Salvador and Mexico; University of Michigan, Ann Arbor—2 Grindelia, Mexico

Department of Geology:

From: Mr. and Mrs. Preston Walker, Grand Junction, Colo.—lower jaw of *Diplacodon*, several turtles; Carl Zangerl, Hazelcrest, Ill.—collection of fossil invertebrates

Department of Zoology:

From: American Museum of Natural History, New York—49 beetle paratypes, 149 beetles, Mexico, United States, Bahamas; Owen E. Atkins, Oshkosh, Wis.—bird skin; Dr. Walter C. Brown, Negros Oriental, Philippine Islands—5 frogs; Chicago Zoological Society, Brookfield, Ill.—6 bird skins, 2 bird skeletons, 1 orang; Stephan J. Copland, Sydney, Australia—lizard paratype; Dr. Jack S. Dandy, Auburn, Ala.—2 lampreys; Henry S. Dybas, Chicago—150 insects and allies; Ralph M. Eiseman, Chicago—1 bird skin

Library:

From: Dr. Austin L. Rand, Chesterton, Ind.; Miss Katherine Harvey, Santa Barbara, Calif.

NEW MEMBERS

(September 15 to October 15)

Contributor

Henry C. Schwab*

Associate Members

Bowen Blair, Paul F. Boyer, Theodore S. Gary, Mrs. Milton L. Laing, Carl R. Lambrecht, Jr., Nelson A. Oser

Sustaining Members

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*Deceased

Posthumous Honor Voted to Henry C. Schwab

In recognition of a bequest of ten unusually valuable pieces of highly artistic Chinese porcelain, the late Henry C. Schwab was posthumously elected a Contributor at a recent meeting of the Museum's Board of Trustees. Contributors are those in a special membership classification that includes all donors of funds or materials valued from $1,000 to $100,000.

SATURDAY AFTERNOON LECTURES CONTINUE

Four more illustrated lectures in the fall series for adults remain to be given in November. All begin at 2:30 o'clock on Saturday afternoons in the James Simpson Theatre of the Museum. Color motion-pictures will accompany each of the lectures, which are provided by the Edward E. Ayer Lecture Foundation Fund.

Limited accommodations make it necessary to restrict admission to adults. However, on the mornings of the same Saturdays the Raymond Foundation presents free motion-picture programs for children.

Following is the schedule of the November lectures for adults:

November 6—Tomorrow Never Comes
Neil Douglas

November 13—American Indian Adventures
C. J. Albrecht

November 20—Argentina
Nicol Smith

November 27—Expedition Ice Cap
Paul E. Victor

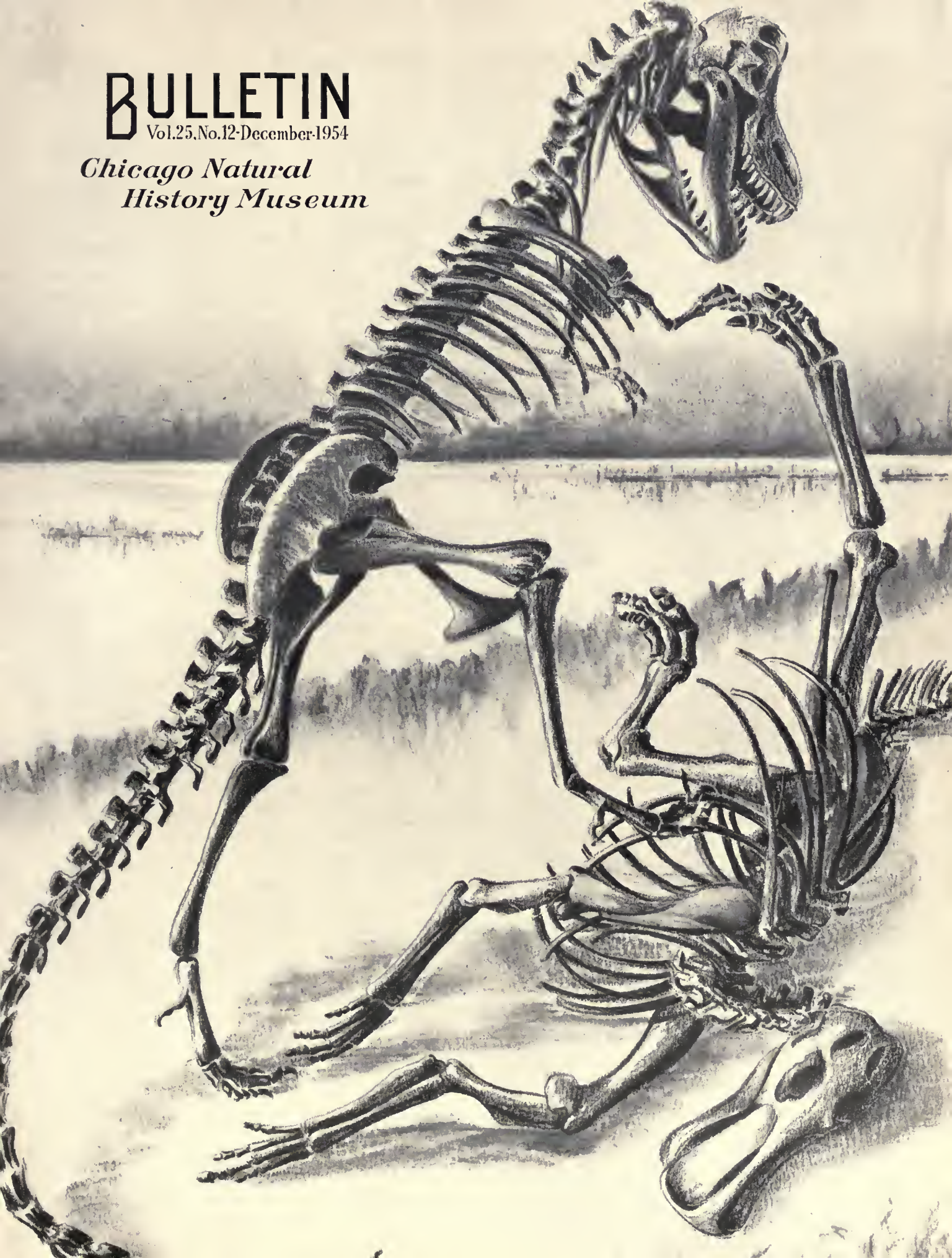
No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

STAFF NOTES

Dr. Sharat K. Roy, Chief Curator of Geology, has left for a three-week trip to Washington, D.C., where he will continue his study of meteorites at the United States National Museum . . . **Dr. R. M. Strong,** Research Associate in Anatomy, presented a paper on "Iridescence in Feathers" before the recent meeting of the American Ornithologists' Union held at the University of Wisconsin . . . **Dr. Karl P. Schmidt,** Chief Curator of Zoology, lectured on "Evolution of Snakes" on October 14 at the College of the University of Chicago . . . **John R. Millar,** Deputy Director, and **Miss Miriam Wood,** Chief of the Raymond Foundation, attended the meeting of the Midwest Museums Conference in Detroit . . . **Miss Marjory West,** who has been appointed Assistant to the Librarian, did editorial work on the *Highland Park News* before coming to the Museum . . . **Karl Plath,** Curator of Birds, Chicago Zoological Park, Brookfield, has been appointed Associate in the Museum's Division of Birds.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

BULLETIN
Vol. 25, No. 12-December-1954
Chicago Natural History Museum



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Members are requested to inform the Museum promptly of changes of address.

一曲陽關

A SONG OF YANG KUAN

BY M. KENNETH STARR
CURATOR OF ASIATIC ARCHAEOLOGY AND ETHNOLOGY

ON NOVEMBER 15 Dr. Hans Stübel, for thirteen months a visiting Fulbright scholar in the Department of Anthropology, left the Museum on his return to the University of Erlangen in Germany.

DR. HANS STUBEL

An unusually versatile man, Dr. Stübel is equally recognized in the two diverse fields of physiology and anthropology, and he also has a fund of knowledge on a wide range of subjects spanning the natural and social sciences and humanities. Born in Leipzig in 1885, Dr. Stübel received his early schooling in Dresden, his boyhood home. He then took premedical training at Jena where, if one may believe his teasing, he drank sour beer and acted rather badly. Further medical study at the universities of Munich and Jena earned him a medical degree in 1908 and then, with the exception of a year's research in Italy, he spent the period from 1910 to 1914 lecturing in the Institute of Physiology at Jena. This academic life ended abruptly in 1914 with the outbreak of World War I in which he served as an army medical officer. Upon his release from service Dr. Stübel returned as full professor to Jena, where he remained until 1923. In that year he decided to accept the position of professor of physiology at T'ungchi, the German-founded university in Shanghai.

STUDIES CHINA'S NON-CHINESE

Then began a life that was to carry him through nearly thirty years of time and through many thousand miles of travel in the Far East. Within a few years after his arrival in China Dr. Stübel turned his questioning mind to the study of the non-Chinese peoples who, almost forgotten, are scattered throughout China, especially in the southeast, south, and west. Working always on his own time and with his own purse as the provider, he journeyed over a large portion of the country. He viewed the traditional beauties—classic Peking, the birthplace of Confucius in Shantung, the stone sculptures of Yunkang, the Yangtze gorges, the potala of Lhasa, and the venerated sacred mountains and religious sites. But also, and more important for science, he observed and described the manners of the non-Chinese peoples who have in varying degrees been assimilated by the culturally dominant Chinese—the Hsia-min of southeast China, the Yao of south China, the Li of Hainan Island, the Miao, Lolo, and Lisu of southwest China, the nomads of the Tibetan grasslands, and the seagoing fishing peoples of the islands off the southeast coast.

His researches carried him to the far reaches of China—to Inner Mongolia, the countryside of Shantung Province, the high plateau that is Tibet, the lonely island fishing villages off the southeast coast, the rugged highlands of the upper Yangtze, and islands of Formosa and Hainan. And then too, there were periodic trips to Java, the Philippines, and Indo-China. Sabbaticals took him on brief trips to Europe via the famous Trans-Siberian Railway.

Not all was gain, however, for his house and books in Shanghai were burned by the Japanese in 1931, and his next quarters north of the city were bombed out in 1937. In 1941 he bore the hardships involved in the transfer of the university to a small village in Szuch'uan, in free West China. There were also lonely periods of severe illness in isolated mountain villages or monasteries, where he himself was his only physician. And there was the heartbreak of seeing his rare ethnological collections and photographs taken by both Nationalists and Communists. He brought his manuscripts out of China in 1951 only by disguising them as wrapping paper. But his years in China on the whole were deeply satisfying, and he often reminisces about them with obvious nostalgia.

In 1951 Dr. Stübel left China and returned to Germany, where he took a position as professor of anthropology at the University of Erlangen. He taught there for two years, and then in September, 1953, he came to the United States and to the Museum as a Fulbright grantee. During his stay in Chicago Dr. Stübel utilized the museum and library resources of the city to put into publishable form a part of his field notes, especially those on the Tibetan nomads. In lieu of his own lost ethnological materials, he made particular use of the Museum's books and specimens.

He spent the summer months journeying through the Southwest, where he observed some of the Indian life of the region. From there he continued along the West Coast, visiting museums and libraries and conferring with colleagues. During his final weeks at the Museum Dr. Stübel was busy bringing to completion his manuscripts on the Tibetan nomads. Before he sails for Europe on December 11, Dr. Stübel will briefly visit the museums and libraries of Boston-Cambridge, New Haven, New York, and Washington.

A JOCULAR SCHOLAR

Dr. Stübel, ever jocular, was asked what he would like to have included in this sketch, and those who know him well will smile in understanding to hear what he said. He suggested that he be described as the bent old man with the white beard, the red eye, the clumsy nose, and the corn on the third toe of his left foot. Most of us will better remember him as a rather short, very distinguished gentleman with a neat white goatee who, hands clasped behind his back, walked quietly but with firm step through the exhibition halls and corridors. And those who had the pleasure of being with him daily and of enjoying quiet dinners with him in the evenings saw him not as a man of nearly seventy, but as one much younger in years, for his youthful spirit and his elastic mind speak of one half his age. He is much to be admired and respected,

(*Continued on page 8, column 3*)

THIS MONTH'S COVER

Our cover presents an artist's conception of how the Museum's new *Gorgosaurus* skeleton will look, when mounted, together with the skeleton of a duckbilled dinosaur of a type that was its frequent prey. The drawing is by Miss Maidi Wiebe, artist on the staff of the Department of Geology. The *Gorgosaurus* skeleton is a gift to the Museum from members of its Board of Trustees (see article on page 3).

Nepal Birds Collected . . .

EXPEDITION ALSO CLINIC FOR HIMALAYA NATIVES

By ROBERT L. FLEMING

THE ARTICLES in the BULLETIN that always catch my eye are the announcements of expeditions going into the field. Naturally the most interesting of all was that of the Himalaya expedition of 1947. For this expedition was mine. I was returning to my station in northern India for another seven years where I was high school supervisor of Woodstock School, Mussoorie. Nine months each year I did school work but I had three months free. This was my expedition time, to study and collect birds and ferns. One season I worked near the school in Tehri State and Dehra Dun District north of Delhi; other seasons I traveled farther afield to central India and, most important, east to Nepal for extensive work made possible through the generosity of the late Boardman Conover of the Museum. Now, on furlough, back in Chicago, my Methodist Mission Board has given me three months in the Museum to study the several thousand birds I collected and to write a report on the birds of Nepal.

"Nepal" is a magic name, a country that for a century has been closed to Occidentals, as forbidden as Tibet to the north of it. Now restrictions are being relaxed and the rulers have become interested in progress and western ideas. In 1949 I was given permission by the Nepal government for a three-month trip. The country is about the same size and in the same latitudes as Florida, lying along the southern slopes of the Himalayas. I decided to survey a cross-section of the country to collect birds from the lowland jungle and grasslands (known as the *terai*) up to the alpine meadows at 16,000 feet, just below the ice and snow of ranges rising to 25,000 feet.

ELEPHANTS USED IN HUNT

We found officials extremely helpful. Field Marshal Rudra Shumshere Jung Bahadur Rana, his sons, Governor Dhairiya Shumshere, Colonel Ishwar Shumshere, a nephew, Sri Bhakti Shumshere, all took an active interest in our expeditions. They sent elephants for our use in the lowlands and gave us guides as interpreters. These companions made all the arrangements for porters, route, camp sites, wood, water, and food.

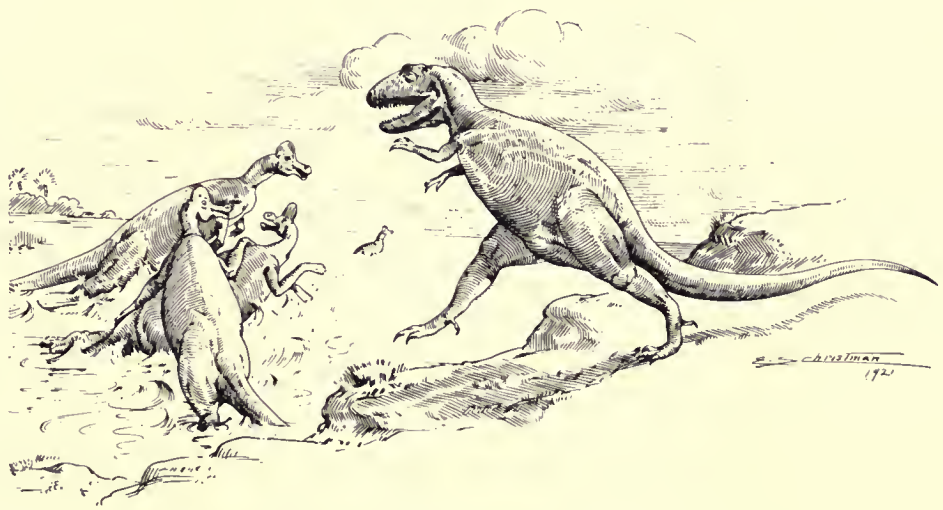
Our collecting that first trip, from October, 1949, to February, 1950, was a success. We got spiny babblers that white men had not seen alive for a hundred years, snow cocks at 16,000 feet as big as turkeys, eleven kinds of pheasants and partridges, a new subspecies of babbling thrush, and a new fruit pigeon. We found the rain forests at 2,500 feet full of birds such as bulbuls, drongos, sunbirds, green magpies, and jungle fowl. We got an entirely different series among the oaks and firs at 10,000 feet—finches, titmice, thrushes, nutcrackers, crossbills, and pheasants. There were 256 different species of birds in all.

In the *terai* at 900 feet we hunted birds of the plains. We cruised the countryside for birds, shooting from elephant back. We pushed aside forest trees in pursuit of a fish-owl, and we combed tall grass for reed warblers. Ordinarily one of us jumped off to retrieve a shot bird, but once, wading in a pond for jacanas, the mahout had himself lowered on the trunk to get the bird. Sometimes I felt ridiculous, charging through the brush on an elephant after nothing larger than a sparrow. But it was an effective method of hunting, for we had almost 100 per cent recoveries. It was tiring, however, and when I got back to camp and slid off the elephant's back my hips felt dislocated. What was more, I found I had been sitting on "sandpaper." It took me a day to recover.

CONTRASTING CULTURES

As we went up the mountains the change in the people of the two main cultures was sudden and striking. Below 5,000 feet Aryan Hindus live in thatched houses

(*Continued on page 4, column 1*)



Courtesy American Museum of Natural History, New York

RESTORATION OF GORGOSAURUS ATTACKING PLANT-EATING CONTEMPORARIES

Once King of Beasts . . .

TRUSTEES GIVE MUSEUM RARE GORGOSAURUS

GORGOSAURUS, a spectacular dinosaur, has come to Chicago Natural History Museum.

In his day, some 75 million years ago, *Gorgosaurus* must have been the king of beasts, a tall, powerful yet agile flesh-eater that preyed upon the more placid vegetarian dinosaurs of the time. His jaws are studded with large sharp-edged teeth, suggesting that he may have been a fearful killer. His prey consisted probably for the most part of the duckbilled dinosaurs that lacked defensive armor.

The skeleton of *Gorgosaurus*—only three other fossil skeletons of this rare creature are known to remain in existence—has been acquired by this Museum as a gift from members of its Board of Trustees. These Chicago businessmen pledged thousands of dollars for the purpose at a recent meeting of of the Board.

FORTY FEET LONG

The *Gorgosaurus* specimen is the largest, most impressive, and one of the rarest acquisitions to reach the Museum in many years. The skeleton is about 40 feet long, and the head will tower more than 15 feet above the floor when *Gorgosaurus* is completely assembled, mounted, and placed among the paleontology exhibits in Ernest R. Graham Hall of Historical Geology (Hall 38). The task of mounting presents a special problem in engineering.

Gorgosaurus will be ready to go on exhibition in about twelve to fourteen months —that much time, at the least, is expected to be required for the intricate tasks involved in preparation. He will be in a group with a specimen of a duckbilled dinosaur of a type upon which he preyed. Preparation of this second giant fossil is currently under way by Orville L. Gilpin, Chief Preparator of Fossils, and his associates. The position of the skeletons of the two huge fossil reptiles will be that of their action during an attack.

"It is impossible to place a money value on a specimen such as this," says Dr. Rainer Zangerl, Curator of Fossil Reptiles, who will supervise the assembling and erecting of the giant skeleton. "To organize and dispatch an expedition to go into the field and excavate a *Gorgosaurus* skeleton

from the Belly River Formation in which it has lain buried for so many millions of years would cost today between $30,000 and $50,000. But even if the money and equipment were available, the attempt would be uncertain of result because the fossil is so rare and no prospects are known. Still more important, even if another were located in the area where this one was discovered in 1914 (on the Red Deer River in the province of Alberta, Canada, not far from Edmonton), we still could not get it, because there are now Canadian laws that prohibit removal of fossils from the country."

Courtesy American Museum of Natural History, New York

A MOUNTED SKELETON OF GORGOSAURUS COMPARED WITH SIX-FOOT MAN

WEIGHED SIX TONS

The entire skeleton of *Gorgosaurus* has arrived at the Museum. The skull alone is 42 inches long, which makes it the largest of the known skulls. In life the animal is believed to have weighed some six tons.

The specimen is one of two that were collected in 1913–14 by Dr. Barnum Brown, famed paleontologist of the American Museum of Natural History in New York. The other specimen he collected is on exhibition in the New York museum, which made its second specimen available about two months ago for purchase by Trustees of Chicago Natural History Museum. The only two other known skeletons of *Gorgosaurus* are in the National Museum of Canada, at Ottawa, and the United States National Museum at Washington, D.C.

BONES OF PROSPECTIVE VICTIM

Parts of skeleton of duckbilled dinosaur being removed from plaster matrix by Orville L. Gilpin, Chief Preparator of Fossils. The specimens, when articulated and prepared for exhibition, will be used in the projected group with Gorgosaurus.

Gorgosaurus is a first cousin to another and better-known terror of the prehistoric world—*Tyrannosaurus*, which also stalked a bloody path of destruction among its gentler herbivorous contemporaries.

HIMALAYA EXPEDITION AND NATIVE CLINIC—

(*Continued from page 3*)

scattered along the southern slopes of the mountains with here and there a shrine to Siva, decorated with red poinsettia leaves. They gather grain from their well-terraced fields to exchange for salt and potatoes from the north. As we climbed between the Dhaulagiri and Annapurna ranges to 8,000 feet, we entered the land of the Buddhists, who look like the people of Tibet. They have Mongolian features, wear padded clothing, and speak a different language. They have stone houses and set up prayer flags, chortan walls, and prayer wheels in their temples. Though these cultures are so different, Southern and Northern Nepalese have much in common. We found them both jolly and their homes neat. They love children and are fond of liquor.

No wheels are known in the mountains of Nepal. Loads are carried by men or pack animals. I walked 300 miles accompanied by Dr. Carl E. Taylor (a Harvard medical man and my former student), R. T. Bergsaker, a Norwegian mountaineer and artist, and Harold Bergsma, a high-school boy. Seven miles a day was about as far as we could go. Our tent was our home. When Bergsma became ill with an unknown fever and could walk no more, we had to carry him sixty miles to the nearest bus.

TRAVELING CLINIC

Dr. Taylor was our medical officer and helped us with the trip. Soon operations and medicines for the local people took more and more of his time. We roped off a space in front of the tent to keep back the crowds. Dr. Taylor, with one of us as assistant, removed a cancer from the face of the mayor of Tansing; he drained a bucket of pus from a man with a liver abscess and an hour later the patient asked for bread for the first time in a month; he made usable fingers for several who had fallen into fire and had burned their hands. He repaired hairlips, and one young girl followed our party a whole week until we could stop long enough to operate and, incidentally, improve her chances of marriage. These cases were handled under the open sky with a stone wall or our tin trunks for the operating table. When we returned over this route two months later we were able to check on our patients.

The success of our first journey led to subsequent ones. In 1951–52 we revisited Tansing and Pokhara in western Nepal. The third time, 1952–53, we went to Kailali-Kanchanpur in the extreme southwestern corner of the country. Governor Dhariyia Shumshere entertained us and arranged for us to collect in the hills of Doti. From there we traveled down through India and paid our first visit to Kathmandu. Later in 1953 we went to eastern Nepal, where I again met my first Nepalese friend, Colonel Ishwar Shumshere who had been so good to us on our first trip and helped us to go to the hills of Okhaldhunga in front of Mount Everest. Thus we have been able to take a cross-section of birds from all parts of the country.

Our first Nepal expedition was for birds, with medical work incidental. The importance of our medical work to the Nepalese was a factor in our getting permission to return for later bird work. The medical work done on these expeditions, first by Dr. Taylor, later by Dr. Bethel Fleming, my wife, and Dr. Carl W. Friedericks, led to our being invited to establish a several-year medical program in the country. Now when I return next year, I go not to India but to Nepal. There, in the Kathmandu Valley, I shall feel privileged in my spare time to continue renewed collecting and field study of the birds of Nepal.

INSECT 'SPECIAL' EXHIBIT MADE PERMANENT

Members' Night visitors at the Museum, when introduced for the first time to the drawers of insects, bird and mammal skins, etc., that make up the Museum study collections, often inquire, "What is all this for?" This question, by far the most commonly asked by laymen, has shown the need for an exhibit that would explain the reason for undertaking the time-consuming and painstaking work of building study collections. Such an exhibit, "The 'Why' of Museum Insect Collections," was designed by Rupert L. Wenzel, Curator of Insects, and Margaret G. Bradbury, Artist. As originally planned, this exhibit was to be a feature for Members' Night only, but it has proved so popular and it so successfully explains a little-known and vital part of a museum's work that it is to be a permanent exhibition in Albert W. Harris Hall (Hall 18). Although it deals specifically with study collections of insects, the exhibit applies equally to other study collections in the Museum, for they all serve essentially the same purpose.

ZOOLOGICAL COLLECTOR HOME FROM AFRICA

Harry Hoogstraal, Head of the Department of Medical Zoology, U. S. Naval Research Unit in Cairo, Egypt, and Field Associate of the Museum, has returned to the United States after two years in Africa and the Near East. He will work at the Museum for a short time on his current study of ticks and tick-borne diseases caused by viruses, rickettsiae, spirochetes, and bacteria. After continuing these studies in Washington, D.C., London, and Paris he will return to Cairo early next year.

Mr. Hoogstraal has sent thousands of mammals, birds, reptiles, and amphibians to the Museum collected while he was working in such places as Uganda, Belgian Congo, Madagascar, and Kenya.

STAFF NOTES

Rupert L. Wenzel, Curator of Insects, has been appointed to the Committee on Professional Status and Standards of the Entomological Society of America. He will attend the first meeting of the committee during the annual meeting of the society to be held at Houston, Texas, from December 6 to 9 (the society recently merged with the American Association of Economic Entomologists to form a single organization of about 4,000 professional members) . . . . **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, spent two weeks at the Museum of Comparative Zoology, at Harvard, conferring with Arthur Loveridge, a world authority. The subject of their discussions involved problems that have arisen in identifying the large collection of frogs sent to the Museum in a research project by the Institute of the National Parks of the Belgian Congo . . . . **Dr. Karl P. Schmidt,** Chief Curator of Zoology, recently lectured to the Biology Club of Valparaiso University on the biogeographical relations of Peru . . . . **Philip Hershkovitz,** Associate Curator of Mammals, recently conducted a seminar at the University of Illinois (Urbana) on "Zoogeographical Relationships of the Mammalian Fauna of Colombia." . . . **Robert A. Krueger** has been appointed Assistant Auditor of the Museum. Mr. Krueger, who completed his studies at Northwestern University, has been on the staff of industrial firms.

THE HOUSING PROBLEM FOR A DOLL

(Photo courtesy United Press)

With the Yuletide holidays approaching, Susan Most, of Berwyn, Illinois, ponders over which is more interesting—a modern doll's house like those now displayed in the shops or a toy tepee from the American Indian collections of the Museum.

NATURE-PHOTO HOBBYISTS REMINDED OF CONTEST

Send your entries now for the 10th Chicago International Exhibition of Nature Photography, to be held at the Museum February 1–28. Final deadline is January 15. Entries are accepted in two divisions, prints and color slides. There are three classifications in each division: animal life, plant life, and general. The contest is jointly sponsored by Nature Camera Club of Chicago and the Museum. Entry forms with full information are obtainable by request to the Museum.

DALLWIG SUNDAY TALKS SUSPENDED FOR 1955

With regret it is announced that Paul G. Dallwig, Layman Lecturer of the Museum, will not present his usual series of Sunday afternoon lectures at the Museum during 1955. Unusual activity in his professional work and his desire to have new material ready for his next series at the Museum necessitated the cancellation of his plan to resume his Layman Lectures in January. In addition, the heavy demand for his services on the public lecture-platform throughout the Midwest has reached proportions considerably exceeding his estimates. He has thus been forced to defer his interesting Sunday afternoon programs until a later date. It is confidently expected that his next series will be presented at the Museum beginning in January of 1956.

Four Added to Contributors' Roll

In recognition of notable contributions to the Museum, four Museum Trustees have been added (one posthumously) to the roll of Contributors. This is an honor in perpetuity extended to persons whose gifts in funds or materials range in value from $1,000 to $100,000. The four recently added are: Marshall Field, Jr., editor and publisher of the *Chicago Sun-Times;* John G. Searle, John P. Wilson, and the late Albert B. Dick, Jr.

Gift of Plant Collection

Recently the Museum received a notable gift from Valparaiso University through the courtesy of Dr. H. B. Poncher, Acting Head of the Department of Biology, and Dr. William Bloom of the same department. Dr. John W. Thieret, Curator of Economic Botany at this Museum, was instrumental in obtaining it. This gift, known as the Karl Demetrio Collection, consists of 5,625 herbarium specimens of flowering plants collected mostly between 1860 and 1900 in the United States, Europe, Australia and the West Indies.

Audubon Lecture on January 9

The next "screen-tour" of the Illinois Audubon Society will be presented in the James Simpson Theatre of the Museum on Sunday afternoon, January 9, at 2:30 o'clock. Alfred G. Etter, the lecturer, will show his film "A Missouri Story." Admission is free to the general public.

Museum Closed on Christmas and New Year's Day

On Christmas and New Year's Day the Museum will be closed so that its employees may spend the holidays with their families. These are the only days in the year that the Museum is not open to visitors.

MYSTERIOUS FISHES FOUND IN CAVE STREAMS

By LOREN P. WOODS
CURATOR OF FISHES

(Continued from last month's Bulletin)

The cave environment offers one of the most secure ways of life there is, provided animals can adjust to the absence of light. Dangers from predators are probably at a minimum. **Sculpins** are found in caves more frequently than are cave fishes, possibly because they are more easily seen since they are larger, darker, and not so shy as cave fishes. **Sculpins** are carnivorous and often two or three times the size of cave fishes. Although several stomachs of **sculpins** from caves have been examined and only invertebrate remains found, the **sculpin** is a possible predator.

Photo by George F. Jackson, Evansville, Indiana

MUSEUM COLLECTOR FISHING UNDERGROUND

Loren P. Woods, ready with dipnet, seeks specimens in large pool inhabited by cavefish in subterranean recesses of Wildcat Cave, Indiana.

In most caves we find raccoon tracks in the muddy banks along the stream. The raccoons enter the caves to catch crayfish and they may take an occasional fish, but again we know of no evidence that they ever do. Another possible mammal predator is the mink. Its appetite for fish is proverbial and there is certainly no reason that a mink could not enter caves and capture fish, but here also the evidence is lacking.

We frequently hear reports in cave regions that cave fishes are washed out of caves in time of flood, a phenomenon that we have never observed. If the reports are true, then cave fishes feeling their way along a stream to re-enter a spring or cave are exposed to the same dangers from birds and other fishes as small surface-stream fishes. However, under such circumstances they are very likely somewhat protected by the turbid condition of the floodwaters.

SUBTERRANEAN TEMPERATURE CONSTANT

In addition to constant darkness, the underground habitat usually has a nearly constant temperature. This temperature in our midwestern subterranean waters is from around 52 to 58 degrees F. depending on the latitude, since this temperature generally reflects the mean annual temperature of the locality. The air temperature in Mammoth Cave, for example, varies from 52 to 56 degrees F. but the water temperature varies scarcely one degree in the course of a year or from year to year.

Other conditions of the cave waters vary considerably. A short time after heavy surface rains the underground streams begin to rise, and quiet confined brooks become raging torrents. Some cave streams may rise only slightly with but a small increase in current, and some may exhibit little or no change. Heavy rains, washing life-sustaining silt and nutriment into the caves, usually cause the underground streams to become turbid, and they may remain so for many days after a rain.

Subterranean streams vary in their conditions as much as surface streams in size, current, bottom, and bank. They may cut through solid rock or be broken into many rivulets among large boulders; they may form waterfalls or rapids or in their sluggish meanders form broad sandbars or mudflats; they may be dammed and form a broad deep lake. In some places floods leave isolated backwater pools, or the stream that is a rushing torrent in time of high water may at low water be fragmented by mudbanks and boulders into a disconnected series of ponds. The streams may wander in broad meanders in rooms of great width entering and leaving a particular cave. Springs appear to be numerous in groundwater streams but tributaries few.

Throughout the range of the Mississippi Valley blindfishes there are vast untilted limestone formations lying beneath the surface. Frequently an outcrop occurs at the surface, usually along valleys of large rivers. These formations, which are very thick, were deposited on the beds of ancient continental seas. During the long period of time that they have been under dry land they have become honeycombed with anastomosing tubes of varying size by the dissolving action of ground-water. Some of the tubes are now filled completely or partly with clay, some with water, and some are dry with only occasional springs or clay banks. The drainage of regions underlaid with a network of solution channels is often largely underground, with only a few large surface streams and some of these may originate as a large spring or disappear underground as a "lost river."

During the 19th century and the early part of the 20th only a few widely separated caves were known to contain fishes. The underlying rock strata of the intervening areas were not well known and it was assumed that each cave system contained an isolated population of animals. It was believed that cave fishes only rarely made their way from cave to cave through surface streams or that they were accidentally dispersed in times of flood by being washed from their caves and carried downstream, subsequently entering and establishing themselves in new caves.

APPARENTLY NOT ISOLATED

Underground dispersal does not appear to be more difficult for subterranean fishes than surface dispersal is for surface fishes. The difficulty in demonstrating this belief lies in the lack of ability of collectors to penetrate into underground waters in enough localities to prove that the populations seen are not geographically isolated. It is known that the solution channel networks cross *under* large river beds and also *under* the ridges forming divides between surface drainage systems. The dispersal of aquatic cave animals would seem to be limited by the extent of particular limestone formations carrying suitable streams and the degree of dissection of these formations

by surface erosion. Another factor that would bring about isolation or prevent occupation would be for the cave-bearing strata to be buried deeply under rocks of later periods or under glacial drift.

The arrival of a glacier tying up the ground-water under it and shutting off all food, finally burying the habitat under a thick layer of drift, would exterminate any subterranean vertebrates. No cave fishes are known to live in the glaciated part of the Mississippi Valley. If they were once living farther north than now, they have for some reason not returned since the retreat of the glacier. There are two or three vague reports of amblyopsids in northern Ohio, northern Indiana, and southern Michigan, and it is not impossible that some may eventually be found in these areas.

EXPLORATION IS RIGOROUS

Cave exploration is strenuous work and usually not very rewarding. During the past three years Dr. Robert F. Inger, Curator of Amphibians and Reptiles, and the writer have searched the waters of more than fifty caves and springs finding cave fishes in only twelve or fifteen of them. The great majority of caves investigated contained fair-sized streams but not enough headroom, so that we covered as much distance in the caves by crawling or wading as we did by walking. The water ranged from knee-deep to as deep as it was possible to wade, and sometimes the ceiling would be so close to the water that it would be difficult to keep the light from being extinguished. It was necessary to maintain a grip on the lamp and dipnet while climbing, wriggling, or wading along, alternately watching the water for fishes and the ceiling for projecting rocks.

Because of conditions in these low wet caves, equipment was kept to a minimum. For light we used miners' acetylene lamps with 8-inch reflectors. These lamps, which were much more satisfactory than flashlights or gasoline lanterns, could be dropped, submerged, or pushed ahead as we crawled, and they would still function, giving a strong, diffuse light. Fish were collected in large wire strainers lashed to a 3- to 4-foot handle. Cloth dipnets could not stand cave conditions and moved too slowly through the water, warning the fish of their approach. Eight-ounce jars with formalin were used to preserve the fish and a two-quart tin pail was satisfactory as a temporary container for living fishes. Even this small amount of impedimenta on occasion seemed almost too much to be dragging along.

Cave fishes may be reduced in numbers in some readily accessible caves, but they will never be exterminated by collectors. However, they are in grave danger of extermination in many areas of their range because of various engineering activities of man. The impoundment of large streams for purposes of hydroelectric power, navigation, or recreation raises the ground-water level, flooding the caves completely, ponding the streams that feed them, and no doubt rendering many of the cave-fish habitats sterile and unfit places to live because the food is washed into higher caves or deposited on the bottom of the newly formed lakes.

This may cause temporary dislocation, but it is not nearly so serious a threat as the development of many oil fields, particularly through the Ohio River Valley. The salt water and oil from numerous wells go down into the underground water and pollute widespread areas. Another important source of pollution in some regions lies in extensive mining and quarrying operations. Silt from stamping and washing operations and sludge from the mines render the nearby waters uninhabitable. A few caves have been utilized as natural sewers by industries or population centers.

Fortunately the best areas for caves and cave animals are not yet polluted because they lie in wild or sparsely populated regions. But certainly large sections of their former range are no longer available to these inhabitants of the underworld.

"Highlights Tours" Offered Daily

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays by advance request.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 4 P.M.

Expedition to Collect Fishes in Mexican Waters

Loren P. Woods, Curator of Fishes, left November 26 for Mexico on an expedition to collect marine fishes. He plans to collect along the Pacific coast in the vicinity of Salina Cruz and Acapulco and on the Gulf of Mexico coast in the Bay of Campeche. He expects to work largely from vessels of the local fisheries.

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 33, No. 4. *Philippine Zoological Expedition, 1946–1947, Systematics and Zoogeography of Philippine Amphibia.* By Robert F. Inger. July 23, 1954. 351 pages. $6.

Fieldiana: Zoology, Vol. 34, No. 26. *Notes on Frogs of the Genus Telmatobius, with Descriptions of Two New Peruvian Species.* By Karl P. Schmidt. July 23, 1954. 11 pages. 20c.

Fieldiana: Geology, Vol. 10, No. 17. *Fauna of the Vale and Choza, 7; Pelycosauria: Family Caseidae.* By Everett Claire Olson. July 29, 1954. 12 pages. 25c.

Fieldiana: Geology, Vol. 10, No. 18. *Fauna of the Vale and Choza, 8; Pelycosauria: Dimetrodon.* By Everett Claire Olson. July 29, 1954. 6 pages. 10c.

Fieldiana: Zoology, Vol. 34, No. 27. *Bats from Chimantá-Tepuí, Venezuela, with Remarks on Choeroniscus.* By Colin Campbell Sanborn. July 23, 1954. 5 pages. 10c.

DO YOUR CHRISTMAS SHOPPING IN EASY CHAIR! LET THE MUSEUM TAKE OVER THE JOB

Christmas shopping is made an easy task by two special services offered by Chicago Natural History Museum. You need not stir out of your home—and you don't have to wrap any packages. Here's how you can buy and send your gifts in complete comfort, away from all crowds and confusion:

(1) Christmas Gift Memberships

Send to the Director the name and address of the person to whom you wish to give a Museum membership, together with your remittance to cover membership fee (see enclosed Christmas gift membership order form).

An attractive Christmas card will notify the recipient that through your generosity he has been elected a Member of the Museum. He will receive also his membership card and information on membership privileges.

(2) Museum Book Shop Gifts

Books endorsed for scientific authenticity by members of the Museum staff are on sale in the BOOK SHOP. The selection is for both adults and children.

When desired, the BOOK SHOP will handle orders by mail and telephone (WAbash 2-9410). It will undertake all details of wrapping and dispatching gift purchases to the designated recipients, together with such personal greetings as the purchaser may specify, charging only postal costs.

TOYS FOLLOW PATTERNS OF EACH CULTURE

(Photo courtesy United Press)

In these pre-Christmas weeks, this picture will kindle familiar emotions in those who have a child or grandchild in their midst. In the foreground, from the Museum's Department of Anthropology, a miniature Eskimo in his kayak and a sledge with dog team emphasize the fact that toys have been important among all peoples and in all ages. The boy comparing modern toys from current displays in the shops with the Eskimo playthings is Paul Kosin, of Berwyn, Illinois. Scattered throughout the Museum's anthropological collections are toys from varied cultures, some from ancient Babylonia dating back more than 3,000 years.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: Holly R. Bennett, Chicago—960 phanerogams; Dr. E. Lucy Braun, Cincinnati—2 phanerogams, Ohio and Illinois; Northwestern University, Evanston, Ill.—"Index to American Botanical Literature"; Mrs. Ellen T. Smith, Lake Forest, Ill.—false lily of the valley, Juneau, Alaska; Valparaiso University, Valparaiso, Ind.—5,625 plants, United States, Europe, Australia, and West Indies; Dr. Chester S. Nielson, Tallahassee, Fla.—245 algae; Mrs. E. C. Perry, Chicago—Polygonum baldschuanicum; Dr. Eugene S. Richardson, Jr., Chicago—2 fungi; Lillian A. Ross, Chicago—Melaleuca nesophila, California; Camillo Sbarbaro, Spotorno, Italy—200 bryophytes; Emil Sella, Chicago—4 fungi; Dr. Earl E. Sherff, Chicago—640 plants, Hawaii; John W. Wood, Maplewood, La.—Quercus, Orange, Texas

Department of Geology:

From: Murray Copeland, Ann Arbor, Mich.—4 slides of mounted Pennsylvania ostracods

Department of Zoology:

From: Sergio Arias C., Caracas, Venezuela—collection of non-marine shells; Lt. Col. Kenneth Burns, Fort Sam Houston, Texas—2 bats in alcohol; Chicago Zoological Society, Brookfield, Ill.—2 snake skeletons, Africa; Dr. Robert L. Fleming, Mussoorie, India—172 birdskins; Florida State Board of Health, Jacksonville, Fla.—56 bats; General Biological Supply House, Chicago—5 sea turtles, 18 flying lizards, India; Dr. Alfred Heinzelman, Piura, Peru—3 rats; Mr. and Mrs. Richard B. Hoger, Westmont, Ill.—14 shore birds, Lake Calumet; Harry Hoogstraal, Cairo, Egypt—2 mammals, 43 birdskins, 144 frogs, 143 lizards, 31 snakes, 5 turtles, collection of land shells, Egypt and Turkey; Dr. John C. Neess, Madison, Wis.—5 lizards, New Mexico and Mexico; Northwestern University, Chicago—15 dog skulls, 12 cat skulls, 2 sets of elephant teeth, 17 reptile skulls, 3 amphibian skulls; Dr. Orlando Park, Evanston, Ill.—collection of shells, world-wide; Dr. Charles H. Seevers, Homewood, Ill.—101 vials of determined termites, 92 vials of partly determined ants, 14 other insects, United States, Neotropics, Philippine Islands; Lt. Col. Robert Traub, Washington, D.C.—3 slides of chigger mites, paratype of *Euschongastia calunosa* Traub and Audy, North Borneo; Dr. Louis O. Williams, Tegucigalpa, Honduras—lizard; George T. Johnston, Rye, N. Y.—390 fishes; Clark E. Jones, Miami, Fla.—six lots of tree snails; Rev. Brother M. Lesage, Achimota, Gold Coast, Africa—6 frogs, 4 lizards, 67 snakes; Dr. Jeanne S. Schwengel, Scarsdale, N. Y.—collection of sea shells; U. S. Fish and Wildlife Service, Pascagoula, Miss.—833 fishes, Gulf of Mexico

NEW MEMBERS

(October 18 to November 15)

Contributors

Albert B. Dick, Jr.,* Marshall Field, Jr., John G. Searle, John P. Wilson

Associate Members

William S. Allmart, Seymour S. Cunningham, George H. Dapples, William R. Dickinson, Jr., Miss Josephine Fritsch, Joel Goldblatt, John E. Mossman

Annual Members

William A. Barr, Miss Nettie A. Baumann, Herbert A. Beigel, B. A. Birndorf, Mrs. C. O. Brewer, George E. Brewer, James E. Burd, Edward J. Chaplicki, W. K. Coolidge, Walter L. Darling, Dennis De Witt, Byron C. Drachman, Gerard J. Eger, Mrs. Charles William Fisher, Mrs. Marie Gallas, Leon S. Glaser, Samuel Gore, Bernard J. Hahn, Dr. John M. Hajduk, Marchand B. Hall, John C. Hanna, B. J. Hoddinott, George R. Ives, Edward F. Johnson, George H. Kane, Paul J. Keller, Dr. B. C. Kolter, James H. Kristof, A. H. Kulikowski, Edward N. Lee, Alexander Leighton, Joseph F. Lizzardo, Mrs. Sidney Loewenstein, H. Norris Love, Earle Ludgin, Stefano Luotto, Dr. I. R. McCall, Franklin J. Meine, W. P. Moore, Dr. Edward L. Moran, Kenneth S. Nathan, Stanley R. Norberg, Henry J. Nord, F. R. Peake, Dr. I. Pilot, A. S. Roebuck, Miss Thyra J. Ruth, Miss Marjorie Scanlon, F. Girard Schoettler, Dr. Howard M. Sheaff, Harvey Z. Sheekman, Mrs. Albert W. Sherer, Mrs. Ann Spector, John Stahl, Emanuel G. Stavish, Mrs. John E. Stoker, Wilfred Tracy, Floyd E. Von Ohlen, Andrew J. Watt, Marshall White, Dr. F. M. Whitsell, Dr. Emilia Wojnarowsky, Miss Lydia Wulf, Wallace E. Yehnert

*Deceased

A SONG OF YANG KUAN (DR. HANS STUBEL)

(*Continued from page 2*)

for his human qualities as well as for his scholarly abilities.

A vignette of the doctor must include references to his courtesy and dignity of manner bred of his European background; his friendliness, his tolerance, and his human understanding springing from association with many peoples; his cosmopolitan sophistication born of wide travel; his talents as a conversationalist, his unusual sense of observation, his keen mind, and his conscientiousness as a scholar; his objectivity and lack of prejudice; and, to flavor the whole, his sharp wit and warm sense of humor.

It was with real emotion that some of us saw him leave, and we can only hope that he will have another opportunity to return. But for now, he has gone, and in way of expressing our feelings we may find satisfaction in the sentiment of a Chinese poem of T'ang times, in the eighth century.

The poem by Wang Wei describes a scene in which a man urges his friend to have one more cup of wine before parting and going westward alone through the Yang Kuan, a distant frontier gate in the far northwest of China, established two thousand years ago during the Han period. The allusion to Yang Kuan in Chinese literature and folklore has for nearly two millenia connoted the parting of friends and loved ones, and so here, for Dr. Stübel, we may sing a song of Yang Kuan.

Botanical Index Received

Recently the Department of Botany received as a gift from Northwestern University Library the *Index to American Botanical Literature*, issued regularly since 1894 by the Torrey Botanical Club, oldest botanical society in the United States. Consisting of more than 75,000 printed cards, the Torrey Botanical Club Index aims to list under the authors' names all papers and books pertaining to American plants. Now housed in two steel cabinets in the Library of the Department of Botany, this index provides a valuable source of reference to all interested users. The transfer of this gift was arranged through the courtesy of Ian W. Thom, Chief of Technical Service, Charles Deering Library, and Dr. Margery C. Carlson, Associate Professor of Biology, both of Northwestern University.

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